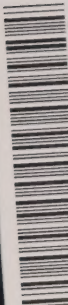


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TABLE OF CONTENTS

	<u>Page No.</u>
Highlights	1
Primary Energy Consumption in Ontario	2
Consumption by Source - Figure 1	3
Consumption by BTU's - Figure 2	4
Annual Percent Increases - Table 1	4
Oil in Ontario	5
Canadian Oil Requirements - Table 2	5
Oil Balance Sheet - Table 3	6
Consumption of Petroleum Products - Figure 3	7
Oil Refineries - Table 4	8
Natural Gas in Ontario	9
Liquefied Natural Gas -	9
Gas Balance Sheet - Table 5	10
Sales 1967 - Table 6	11
Receipts and Disposition 1962-1967 - Figure 4	12
Sales 1962-1967 - Figure 5	13
Coal in Ontario	14
Coal Balance Sheet - Table 7	15
Consumption by Industrial Consumers - Table 8	16
Electricity in Ontario	17
Electric Energy 1967 - Table 9	18
Pipelines in Ontario	19
Natural Gas Pipelines - Table 10	20
Oil Pipelines - Table 11	20

1981-1982

1981-1982

Highlights

Ontario's total energy consumption in 1967 exceeded the 1966 total by 5 percent. Natural gas consumption, 14 percent above 1966 consumption, experienced the greatest annual increase for individual fuels.

Oil production in Ontario was 1,240,298 barrels in 1967, a decrease of 6 percent from the 1966 level. Similarly, natural gas production dropped 8.5 percent to 14,218.1 million cubic feet.

During 1967, for the first time, all the available oil and gas rights for Lake Erie - some 3.1 million acres - were leased from the Crown. Six new gas pools, in total, were discovered in Lake Erie which will add appreciably to Ontario's ultimate recoverable reserves of natural gas.

In early 1967 the oil and gas rights to one million acres of the Hudson Bay - James Bay Lowland area were obtained from the Crown.

Ontario produced over 3,100 tons of uranium oxide during 1967, representing over 75 percent of total uranium production in Canada.

On the 1st of July, 1914, the ship "Albatross" was
in the harbor of San Francisco, and on the 2nd of July
it sailed for the Hawaiian Islands.

Continued.

The "Albatross" was under the command of
Lieutenant Commander J. H. Murray, and was
accompanied by the "Thetis" and the "Albatross".

On the 3rd of July, the ship "Albatross" was
in the harbor of San Francisco, and on the 4th of July
it sailed for the Hawaiian Islands. The ship
was accompanied by the "Thetis" and the "Albatross".

On the 5th of July, the ship "Albatross" was
in the harbor of San Francisco, and on the 6th of July
it sailed for the Hawaiian Islands. The ship
was accompanied by the "Thetis" and the "Albatross".

Primary Energy Consumption in Ontario

Primary energy consumption may be defined here as the input or consumption of the initial energy source and includes primary energy lost in the transformation process. For instance, one kilowatthour of electricity of 3,412 BTU's produced is assumed to require 10,000 BTU's of heat input from coal or nuclear fuel used in thermal generating stations.

A measure of each energy source's participation in the total energy picture is achieved by converting each to its heat equivalent measured in British Thermal Units (BTU). The following charts illustrate the relative magnitude of primary energy consumption in Ontario for 1967 based on estimates produced by the Branch.

The total primary energy consumption in 1967 was nearly $1,800 \times 10^{12}$ BTU's, a 5.0 percent annual increase compared to 3.9% in 1966.

Oil continues to dominate the energy sector of the economy but indications are that it is slowly losing ground to natural gas and electricity which currently are achieving the highest growth rates. Coal's loss of participation in most fuel markets is being minimized by increased demand for electrical generation.

Primary electricity from water and nuclear power represents 8.6 percent of total energy consumption. However, total electricity is 19.3 percent, reflecting increasing use of coal-fired generating stations. Electricity purchased from other utility systems outside Ontario represents a supply deficiency within the Province.

The following is a summary of the main points of the report of the Committee on the Medical Education of the American Medical Association, as presented at the annual meeting of the Association at Atlantic City, N. J., June 1-5, 1928.

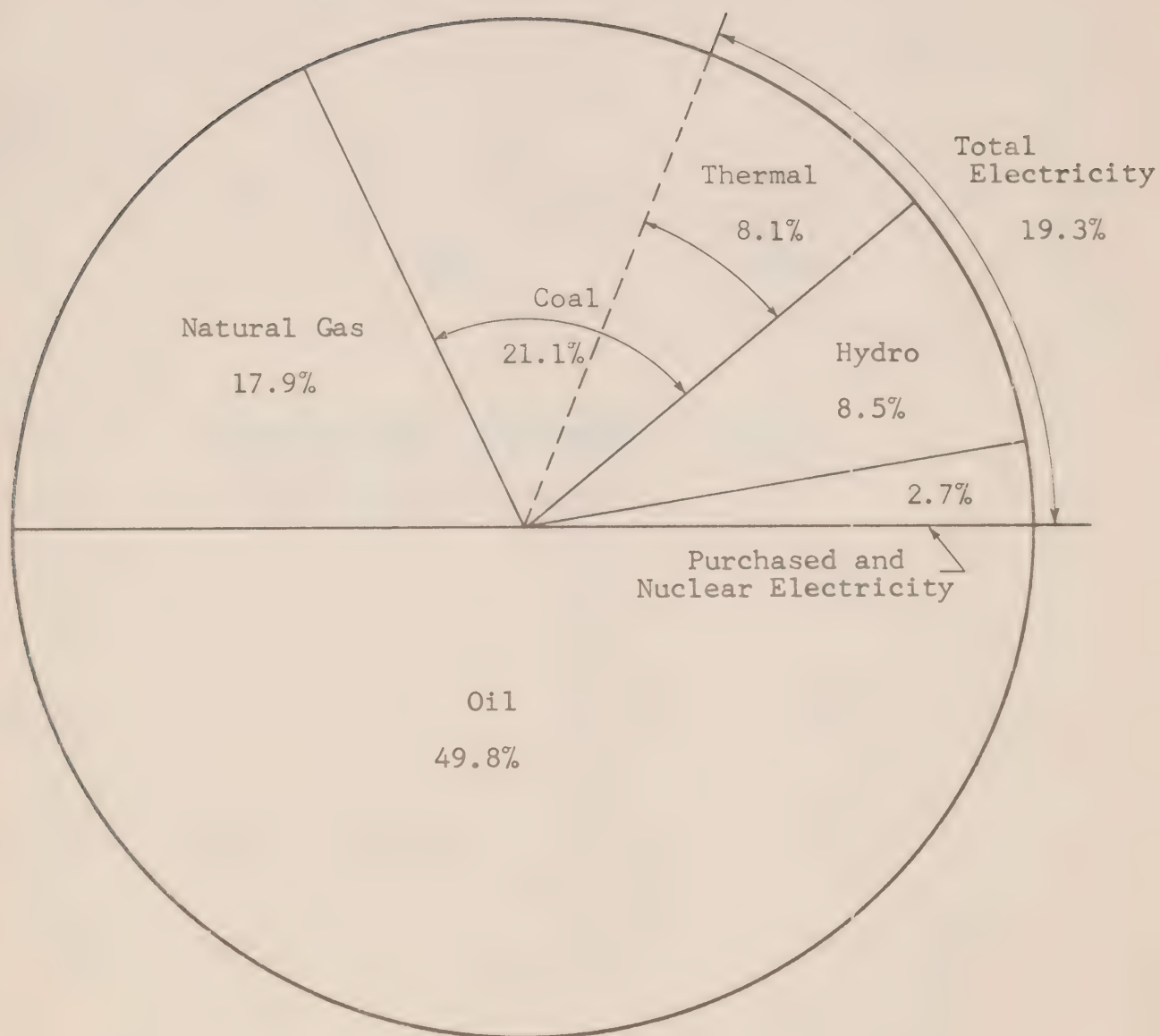
The Committee has been organized to study the problem of the medical education of the American physician, and to make recommendations to the Association and to the public.

The Committee has held numerous public hearings, and has received many suggestions from the public and from the medical profession.

The Committee has also conducted extensive research into the various factors which influence the quality of medical education, and has found that there is a need for a more uniform and more efficient system of medical education in this country.

The Committee has therefore recommended that the American Medical Association should take certain steps to improve the medical education of the American physician, and that the public should be made more fully aware of the importance of this problem.

PRIMARY ENERGY CONSUMPTION BY SOURCE
AS PERCENT OF TOTAL CONSUMPTION FOR 1967

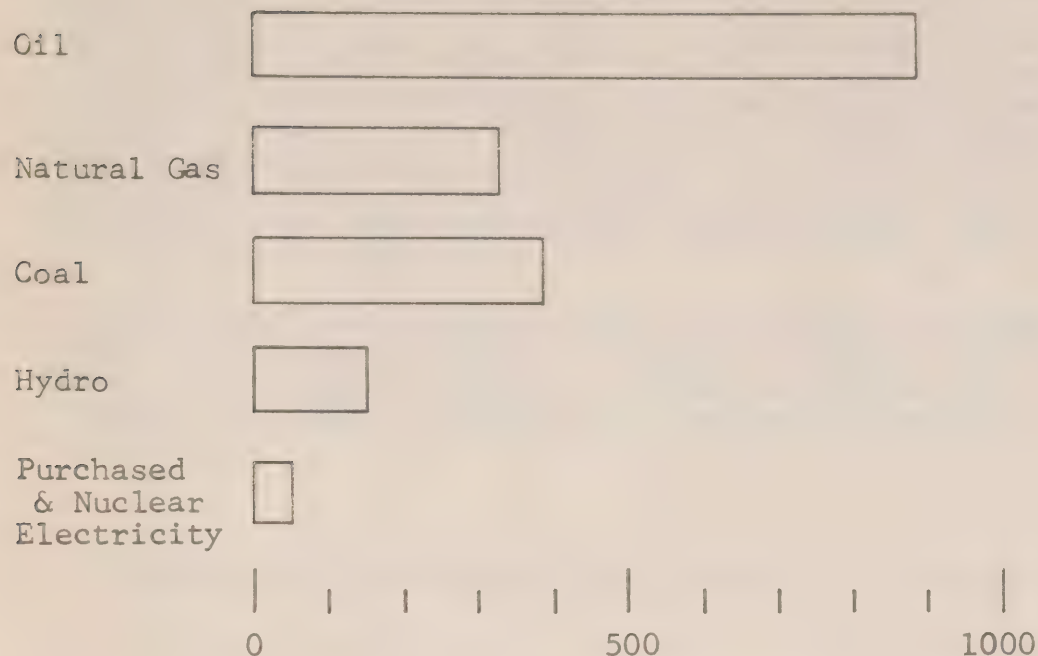


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Primary Energy Consumption in Ontario 1967
in 10^{12} BTU's



Ontario Energy Consumption - Table 1
Annual Percent Increase

	<u>1967</u>	<u>1966</u>
Oil	4.9	2.1
Natural Gas	14.1	10.1
Coal	2.2	- 1.3
Electricity (primary & secondary)	8.4	7.3
Total Primary Energy	5.0	3.9

Oil in Ontario

Ontario crude oil production continued to account for around one percent of total refinery requirements despite a 6 percent reduction from the 1966 level. No additional refinery capacity was added in 1967. However, the main reason for the absence of increased supply of crude oil from Western Canada was limited pipeline capacity. Petroleum product transfers from other provinces and imports are expected to continue to increase until current pipeline expansion projects are completed. Products movements from other provinces, mainly Quebec, and imports increased by 11 percent over 1966.

Refined petroleum products sales in Ontario increased to more than 143 million barrels, a 5 percent increase over sales in 1966. The corresponding increase for total Canada was 6.8 percent. Ontario continued to account for around 33 percent of total sales in Canada.

Canadian Oil Requirements in Percent of Total for 1967- Table 2

	<u>Ontario</u>	<u>Prairies and NWT</u>	<u>Quebec and Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	24.8	16.2	--	8.2	49.2
Imported	0.1	0	35.6	0	35.7
Total	24.9	16.2	35.6	8.2	84.9
Net Product Imports	1.7	0.1	11.5	1.0	14.3
Provincial Transfers*	6.3	-1.6	-4.4	0.5	0.8
Total Consumption	32.9	14.7	42.7	9.7	100.0

* Product transfers between provinces plus other materials to stills plus inventory changes.

Ontario Oil Balance Sheet 1967 (1) - Table 3

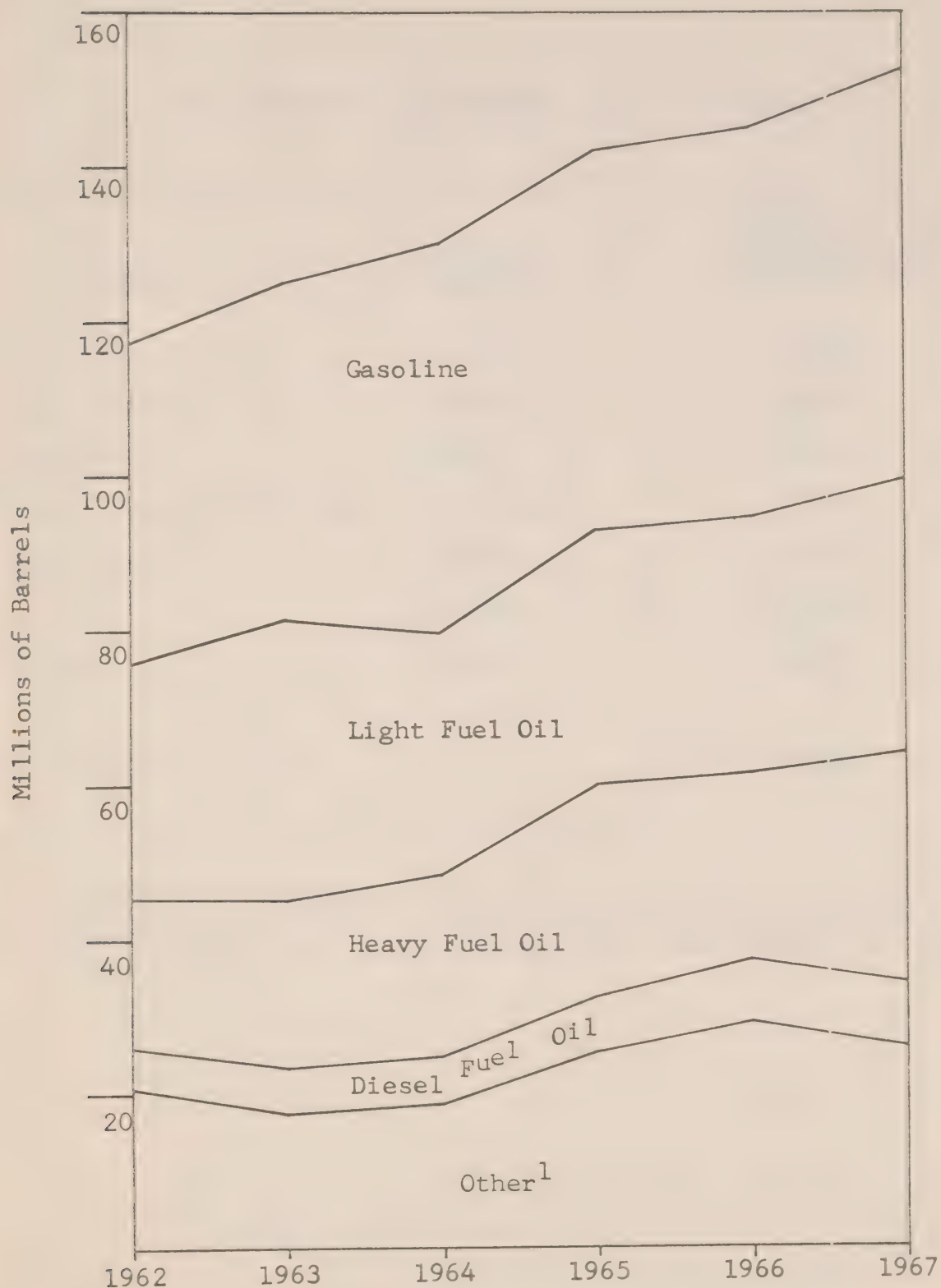
<u>Supply</u>	<u>Quantities in Thousands of Barrels</u>	<u>Percent of Total</u>
Crude Oil - Ontario Production (2)	1,240	0.8
- Imports from Western Provinces	111,704	71.6
- Imports from Venezuela	445	0.3
- Net Transfers and Other Materials	1,145	0.7
- Total Run to Stills	114,534	73.4
Products - Transfers from Other Provinces	30,268	19.4
- Imports	9,057	5.8
- Other Receipts	2,101	1.4
- Total Product Receipts	41,426	26.6
Total Supply	155,960	100.0

Disposition

Consumption - Customer Sales	143,347	91.9
- Company Use	8,786	5.6
- Total Consumption	152,133	97.5
Other - Transfers to Other Provinces	3,420	2.2
- Exports	1,073	0.7
- Product Inventory Changes	- 850	- 0.5
- Losses	184	0.1
Total Disposition	155,960	100.0

(1) Based on data from DBS Monthly Reports, No. 45-004.

(2) Crude oil, condensate and pentanes plus, commingled propane and butane mixes.

CONSUMPTION OF PETROLEUM PRODUCTS IN ONTARIO1962 - 1967

1. Other = Petro-chemical feed-stocks, aviation fuels, Kerosene, asphalt, etc.

Oil Refineries in Ontario - 1967 Table 4

<u>Company</u>	<u>Location</u>	<u>Crude Oil Capacity in barrels per calendar day</u>
B.A. Oil	Clarkson	55,400
B.P. Refinery	Oakville	32,000
Imperial Oil	Sarnia	94,000 *
Texaco (Regent Refining)	Port Credit	37,000
Shell Canada	Oakville	34,000
	Sarnia	40,000
Sun Oil	Sarnia	30,000
Total (7 refineries)		322,400

* An additional capacity of 28,000 b/d, originally scheduled for completion in 1967, was deferred to 1968 so that new addition totalling 36,000 b/d could be made giving new total of 130,000 b/d.

Natural Gas in Ontario

Sales of natural gas to consumers in the province during 1967 increased nearly 16 percent and accounted for over 40 percent of total sales in Canada compared with 34 percent in 1966. Receipts from Western Canada decreased slightly continuing the 1966 trend of relatively stable supplies from this source. The bulk of the consumption increase was provided by advances over 1966 of nearly 60 percent more imports from the U.S.A. and 40 percent greater withdrawals from storage augmented by 4 percent less deposits into storage. Gas used in transmission operations accounted for around 9 percent of total Western Canada receipts as in 1966. A decrease of over 8 percent in production from Ontario wells reduced its contribution to total requirements to around 4 percent from more than 5 in 1966.

The initial 157-mile section of the new pipeline from Western Canada completed during the year from the central part of Michigan to near Sarnia accounted for nearly 20 percent of U.S. imports. Completion of the remaining 830 miles of this project is planned for the Fall of 1968 when Western Canada gas mainly is to be transmitted through this line to Ontario.

The 16 percent sales increase was a material addition over the corresponding 1966-65 advance of 10 percent and compares with the 1965-64 increase of 14 percent. Industrial users accounted for only one percent of total customers but nearly 50 percent of total sales as in 1966, representing advances of over 2 percent in customers and nearly 20 percent in consumption compared with like 1966-65 increases of over 4 and 11 percent respectively. Consumption by residential and commercial users increased by over 8 and 18 percent respectively compared with corresponding 1966-65 advances of over 4 and nearly 18 percent. A levelling off in the annual growth rate of all three categories of customers further is indicated by their lower 1967 increases of nearly 2 percent in residential and 5 in commercial when compared with corresponding 1966 advances of over 3 and under 7, and 4 and 7 percent in 1965.

Liquefied Natural Gas

A significant innovation in the natural gas industry is the large scale storage of natural gas as a liquid. Natural gas when liquefied at minus 260 degrees F increases in density by a factor of 630 compared to the gas at normal temperature and pressure.

Northern and Central Gas Corporation Limited is constructing on its Sudbury lateral at Hagar a liquefied natural gas peak shaving plant which is scheduled for completion during the summer of 1968. This facility, with an equivalent gas capacity of 600 million cubic feet, will be available for peaking requirements during the heating season.

ONTARIO GAS BALANCE 1967 - Table 5

		<u>Thousands Cubic Feet*</u>	<u>Percent of Total</u>
<u>Supply</u>			
Ontario production		14,218,140	4.4
Imports from:			
Western Canada	236,709,579		73.7
U. S. A.	<u>70,350,013</u>		21.9
		<u>307,059,592</u>	
Total Supply		<u>321,277,732</u>	<u>100%</u>
 <u>Disposition</u>			
Sales to customers		279,190,901	86.9
Free Gas	54,447		
Company Use	<u>26,874,458</u>		8.4
		<u>26,928,905</u>	
Total Consumption		306,119,806	95.3
Gas to Storage (Net)	5,389,000		1.7
Gas to Province of Quebec	3,269,530		1.0
Exports to U.S.A.	3,993,845		1.2
Metering, Line loss & other unaccounted for	<u>2,505,551</u>		0.8
		<u>15,157,926</u>	
Total Disposition		<u>321,277,732</u>	<u>100%</u>

* at 14.73 p.s.i.a.

NATURAL GAS SALES IN ONTARIO IN 1967 - TABLE 6

COMPARATIVE TOTALS BY CUSTOMER CATEGORIES

Quantities in Thousands Cubic Feet

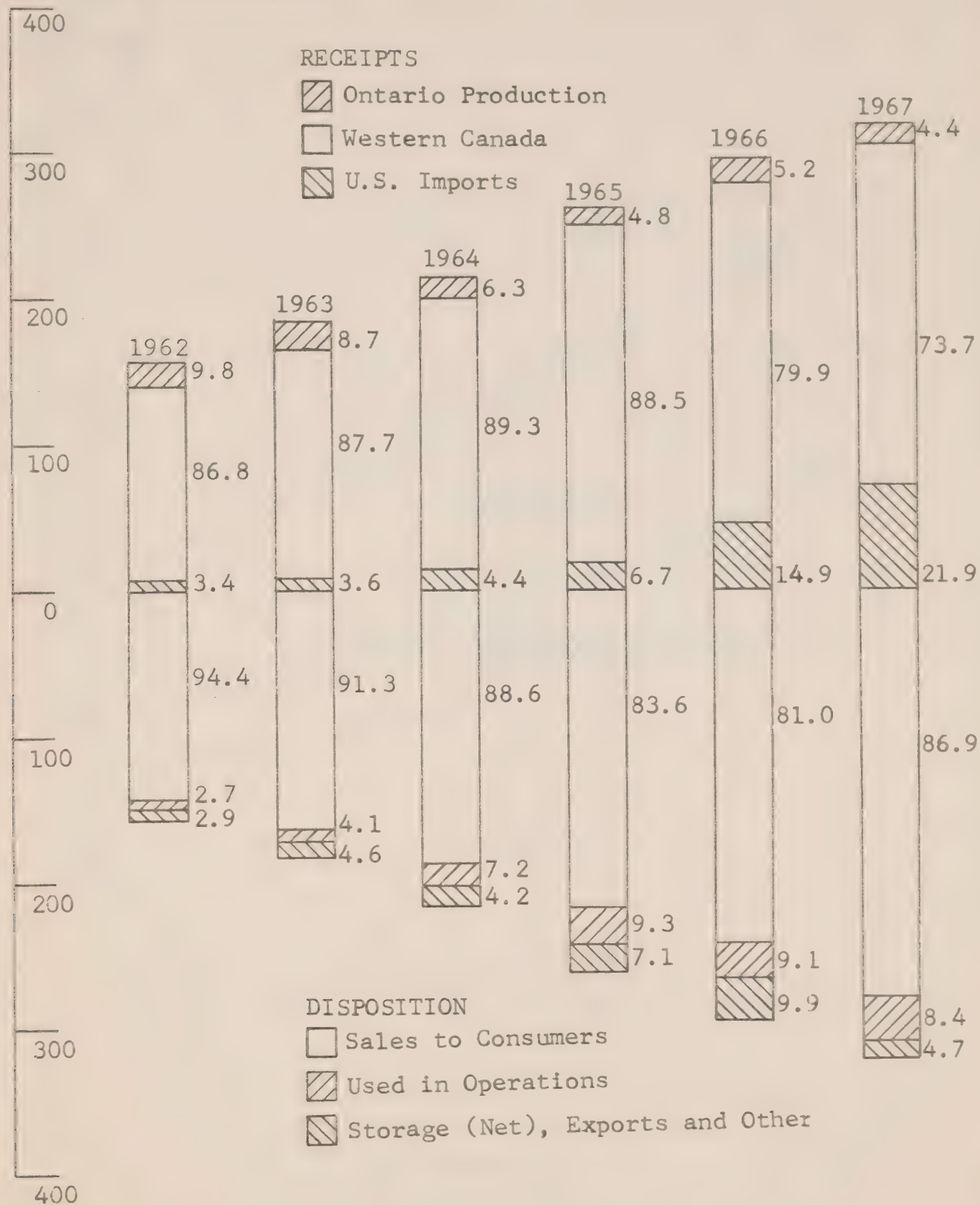
Category of Customer	1967		Percent Changes 1967			
	Number of Customers	Quantities	Number of Customers	Quantities	Number of Customers	Quantities
Residential	664,460	88,962,786	+ 1.9	+ 8.6	+ 24.0	+ 60.8
Commercial	58,645	50,860,987	+ 4.7	+ 18.4	+ 35.7	+ 169.1
Industrial	7,185	139,367,128	+ 2.6	+ 19.9	+ 30.4	+ 86.0
Totals	730,290	279,190,901	+ 2.1	+ 15.8	+ 24.8	+ 87.2

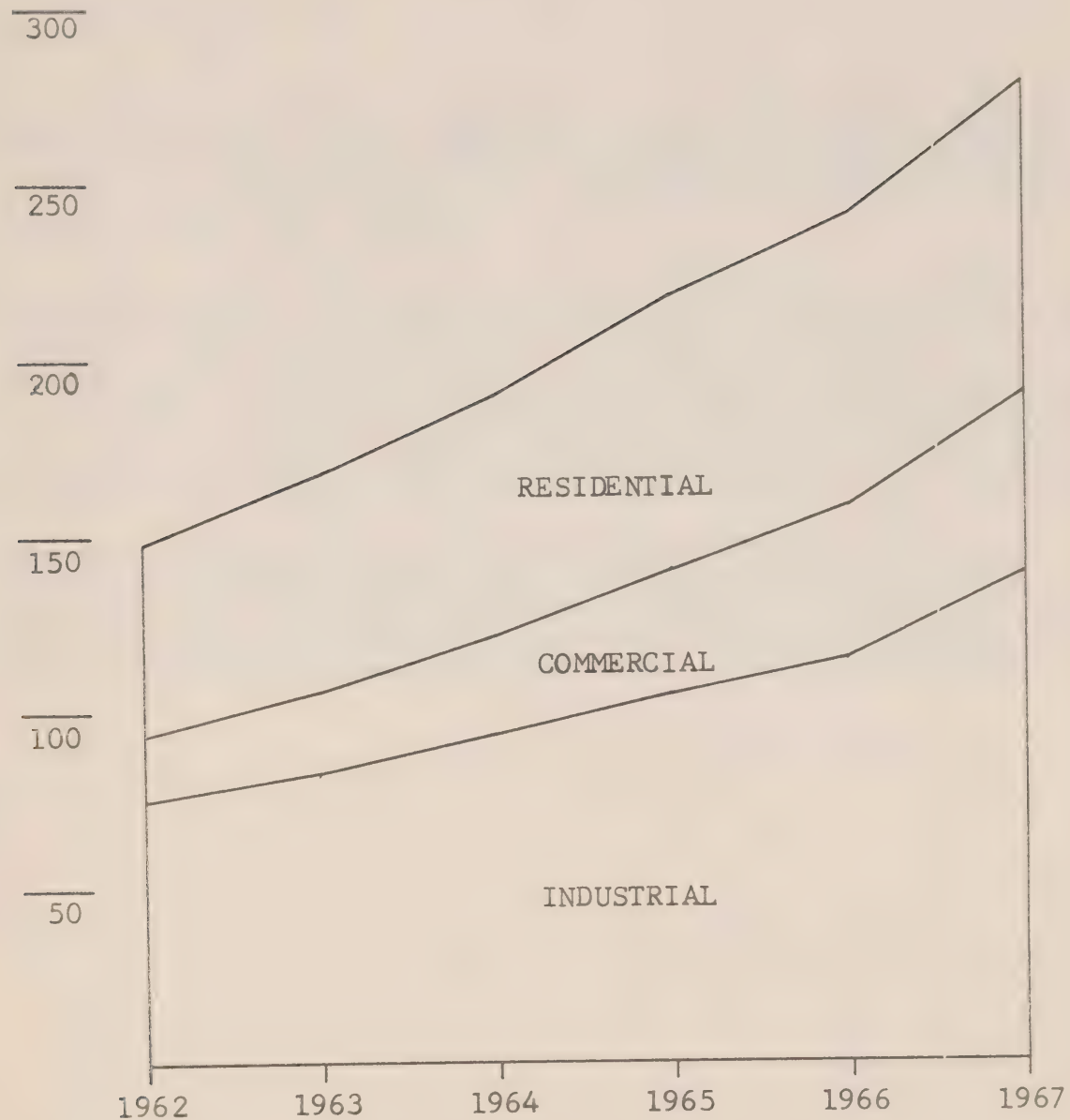
Figure 4

NATURAL GAS RECEIPTS AND DISPOSITION 1962-1967

EXPRESSED AS PERCENTAGES OF TOTAL QUANTITIES

Billions of Cubic Feet



NATURAL GAS SALES IN ONTARIO 1962-1967Millions
of Mcf

Coal in Ontario

Coal represented about 21 percent of the total primary energy consumption in Ontario. The total receipts of coal in Ontario in 1967 was nearly 60 percent of the total receipts in Canada, with Ontario accounting for over 90 percent of the net landed imports of coal into Canada.

Coal use is declining in most types of demand but is making spectacular gains as a fuel for electricity generation, accounting for nearly one third of all coal consumed in Ontario. Coal consumption by Ontario Hydro alone reached an all-time high of 4.9 million tons in 1967, an increase of 29 percent over 1966 consumption. This represents nearly 65 percent of the coal consumed by individual consumers in the combined areas of Central and Southern Ontario where most of these coal-fuelled stations are located.

Imported bituminous coal from the United States accounted for 90 percent of Ontario's total coal supply because of the ready availability of low-cost supplies to Ontario's major demand centres. Remaining supplies were met by receipts from Nova Scotia with lesser amounts from the Western Provinces, mostly to the Lakehead.

in thousands of short tons, rounded to nearest 1000

	<u>Anthracite</u>		<u>Bituminous</u> ⁴		<u>Lignite</u>		<u>Total</u>	
	1966	1967	1966	1967	1966	1967	1966	1967
<u>Supply</u>								
Domestic:								
Western Provinces	--	--	49	68	226	243	275	311
Nova Scotia	--	--	960	1,051	--	--	960	1,051
Total	--	--	1,009	1,119	226	243	1,235	1,362
Imports: U.S.A.	297	301	14,578	14,333	--	--	14,875	14,634
Total Coal Supply	297	301	15,587	15,452	226	243	16,110	15,996

Demand

Industrial:

Consumption (1)	138	115	8,133	8,879	210	244	8,481	9,238
Net to Inventory (2)	+8	-7	+935	+545	+6	-6	+949	+532
Total Demand	146	108	9,068	9,424	216	238	9,430	9,770
Other (3) - Total Demand	151	193	6,519	6,028	10	5	6,680	6,226
Total Coal Demand	297	301	15,587	15,452	226	243	16,110	15,996

- Note: (1) Industrial includes electric utilities, mining and manufacturing.
 (2) Does not include stocks held by firms using less than 1,000 tons per year nor stocks held by coke producers.
 (3) Retail to residential, commercial and small industrial users, including railway, ship bunkers and government and institutional consumption.
 (4) Negligible quantities of sub-bituminous are included in bituminous.

in thousands of short tons, rounded to nearest 500

Economic Regions	Anthracite		Bituminous		Lignite		Total	
	1966	1967	1966	1967	1966	1967	1966	1967
Eastern Ontario	--	--	135.0	130.0	--	--	135.0	130.0
Lake Ontario	1.0	2.0	285.0	235.5	--	--	286.0	237.5
Metropolitan, Niagara, Upper Grand R. and Georgian Bay	103.0	81.0	4,750.0	5,576.0	--	--	4,853.0	5,657.0
Lake Erie, Lake St. Clair	34.0	32.0	2,023.5	1,891.5	--	--	2,057.5	1,923.5
Northeastern Ontario	--	--	705.5	752.5	--	--	705.5	752.5
Northwestern Ontario	--	--	243.0	293.0	210.0	244.0	444.0	537.0
Total Ontario	138.0	115.0	8,133.0	8,878.5	210.0	244.0	8,481.0	9,237.5

Source: DBS Cat.No. 45-002

Note: No sub-bituminous coal reported.

Electricity in Ontario

The total consumption of electricity in 1967 was 56,700 million kilowatt-hours, an increase of 5.6 percent over 1966. In terms of end-use consumption, hydroelectricity provided for 66.3 percent of total consumption and thermal-electricity 25.4 percent. The remainder was provided by purchased electricity from outside Ontario.

Hydro, or water power, continues to be the dominant source of electrical generation but the trend is diminishing with the future favouring thermal generation, both conventional and nuclear. In 1967 electrical generation from coal-burning generating stations increased over 27 percent relative to 1966. Total nuclear generation from the Nuclear Demonstration Plant at Rolphton and the Douglas Point Generating Station at Kincardine was a small but significant output of 143 million kilowatthours. By the mid-1970's nuclear generation is expected to increase a hundredfold, representing about 25 percent of the total generation in Ontario.

Ontario Electric Energy - 1967 in billions (10⁹) kwh - Table 9

Net Generation	Canada (1)	Ontario (1)	OHEPC (3)
Utilities - Hydro	104.4	36.0	34.2
- Thermal	28.4	13.1	13.0
- Total	132.8	49.1	47.2
Industry - Hydro	27.7	1.6	--
- Thermal	4.3	1.3	--
- Total	32.0	2.9	--
Total All - Hydro	132.1	37.6	34.2
- Thermal	32.7	14.4	13.0
- Total	164.8	52.0	47.2
Energy Purchased - Net	0.1 (2)	4.7	7.4
Total Consumption	164.9	56.7	54.6
Increase over 1966 in %	5.6	5.6	5.6

(1) Source: DBS Cat. No. 57-001, Vol. 35, No. 12,

(2) Canada Total refers to net imports from U.S. and does not include transfers between provinces.

(3) Hydroscope - 1967 Annual Report Supplement, May 31, 1968.

Pipelines in Ontario

Extensions and improvements of pipeline facilities to serve both the increasing requirements of the existing markets and the needs of new customers accounted for considerable activity and expenditure in the industry.

The major construction project for the Union Gas Company of Canada was the extension of the 34 inch diameter main transmission line for 37 miles to a point near the city of Hamilton. This was the third step in the program to loop completely the present 142 miles, 26 inch diameter, high pressure pipeline extending from the Dawn compressor station to the point of connection with the facilities of Trans-Canada Pipe Lines Limited at Oakville. The 18.5 miles of pipeline required to complete this entire project is expected to be constructed at a future date when needed.

Consumers' Gas Company completed an extension of their existing 30 inch transmission line located in the northwestern section of Metropolitan Toronto from Keele Street to Yonge Street.

Major projects of Northern and Central Gas Corporation included:

- the construction of the Atikokan Town lateral which required 7.1 miles of 6 and 8 inch transmission line and construction of the Atikokan distribution system;
- an eighty-mile, 8 inch transmission line was constructed to serve the Griffith Mine at Bruce Lake and a short lateral and distribution system was constructed to serve the community of Ear Falls;
- extensive improvements were made to the distribution system and propane-air plant in Sault Ste. Marie (natural gas is expected to reach Sault Ste. Marie by the end of 1968 as part of the Great Lakes Gas Transmission project);
- a major feeder main consisting of two miles of 8 inch pipe was installed to supplement the North Bay distribution system;
- and the construction of several distribution systems in whole or part was completed at Trenton and Brunetville (near Kapuskasing).

In 1967, Trans-Canada Pipe Lines Limited completed 15 miles of 36 inch pipeline from the international boundary near Sarnia to storage fields in Dawn Township and the first 19 miles of 36 inch loop line of its 30 inch system in eastern Manitoba and northern Ontario.

Interprovincial Pipe Line Company initiated the first looping on the 20 inch crude oil line between Sarnia and Port Credit with the construction of 56 miles of 20 inch pipe in 1967.

NATURAL GAS PIPELINES IN ONTARIO - Length in Miles - Table 10

	Gathering & Transmission	Distribution	Total
1967	4,752.	14,090.	18,842.
1966	4,670.	13,286.	17,956.
1965	4,891.	12,291.	17,182.
1960	4,464.	9,493.	13,957.
1955	2,507.	4,765.	7,272.

OIL PIPELINES IN ONTARIO - Length in Miles - Table 11

1965⁽¹⁾ 1967⁽²⁾

Total Trunk Lines, Crude Oil

Interprovincial Pipe Line Co.	233.	289.
-------------------------------	------	------

Total Products Lines:

Sarnia Products Pipeline	245.	245.
Sun-Canadian Pipe Line Co.	212.	212.
Sun Pipe Line Co.	2.	2.
Trans-Northern Pipe Line Co.	388.	388.
	847.	847.

Total Oil Pipelines	1080.	1136.
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(1) DBS Cat. No. 55-201.

(2) Increases from Company Annual Reports.

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TABLE OF CONTENTS

	<u>Page No.</u>
Highlights	1
Primary Energy Consumption in Ontario	2
Percent Breakdown	3
By Source in BTU's	4
Annual Percent Increases	5
Oil in Ontario	6
Oil Balance Sheet	7
Canadian Oil Requirements	8
Sales of Petroleum Products	9
Oil Refineries	10
Natural Gas in Ontario	11
Gas Balance Sheet	12
Sales 1968	13
Sales 1963-1968	14
Coal in Ontario	15
Coal Balance Sheet	16
Consumption by Industrial Consumers	17
Electricity in Ontario	18
Electric Energy Balance	19
Pipelines in Ontario	20
Pipeline Mileage	21

HIGHLIGHTS

Total energy consumption in Ontario in 1968 increased 7 percent over 1967. Coal and natural gas consumption, both 9 percent over 1967, had the largest increases for individual energy sources.

Highlights of Ontario's oil and gas industry during 1968 included a general increase in exploration activity, a high success ratio for exploratory drilling and several significant discoveries, both on land and offshore.

Ontario crude oil production of 1,150,779 barrels decreased 7 percent over 1967. Natural gas production of 12,065.8 million cubic feet was a 15 percent decrease from 1967.

Completion of the new natural gas pipeline from Western Canada in the late Fall enabled demands to be met increasingly from Canadian sources and less from the U.S.A. 1968 additions to oil pipeline facilities and refinery capacities also resulted in greater supplies from Western Canada and a lower inflow of U.S. oil products

Primary Energy Consumption in Ontario

Primary energy consumption may be defined here as the input or consumption of the initial energy source and includes primary energy lost in the transformation process. For instance, one kilowatthour of electricity of 3,412 BTU's produced is assumed to require 10,000 BTU's of heat input from coal or nuclear fuel used in thermal generating stations.

A measure of each energy source's participation in the total energy picture is achieved by converting each to its heat equivalent measured in British Thermal Units (BTU). The following charts illustrate the relative magnitude of primary energy consumption in Ontario for 1968 based on estimates produced by the Branch.

The total primary energy consumption in 1968 was nearly 1,900 $\times 10^{12}$ BTU's, a 7.1 percent annual increase compared to 5.0 percent in 1967.

Oil continues to dominate the energy sector of the economy but indications are that it is slowly losing ground to natural gas and electricity which currently are achieving the highest growth rates. Coal's loss of participation in most fuel markets is being more than offset by increasing demand for electrical generation.

Primary electricity from water and nuclear power represents 8.6 percent of total energy consumption. However, total electricity is 20.0 percent, reflecting increasing use of coal-fired generating stations. Electricity purchased from other utility systems outside Ontario represents a supply deficiency within the Province.

Figure 1

PRIMARY ENERGY CONSUMPTION BY SOURCE
AS PERCENT OF TOTAL CONSUMPTION FOR 1968

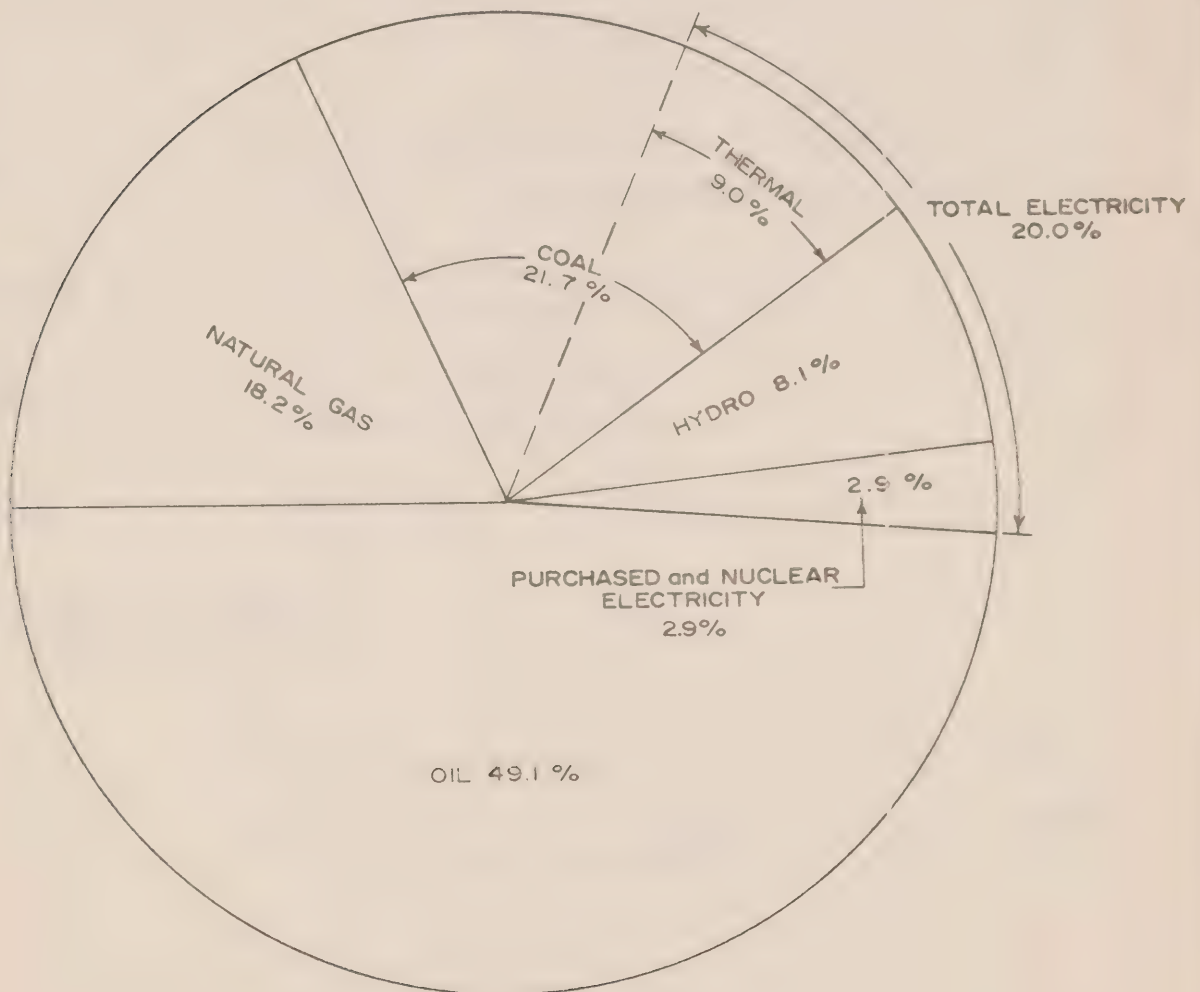


Figure 2

PRIMARY ENERGY CONSUMPTION IN ONTARIO
IN 1968

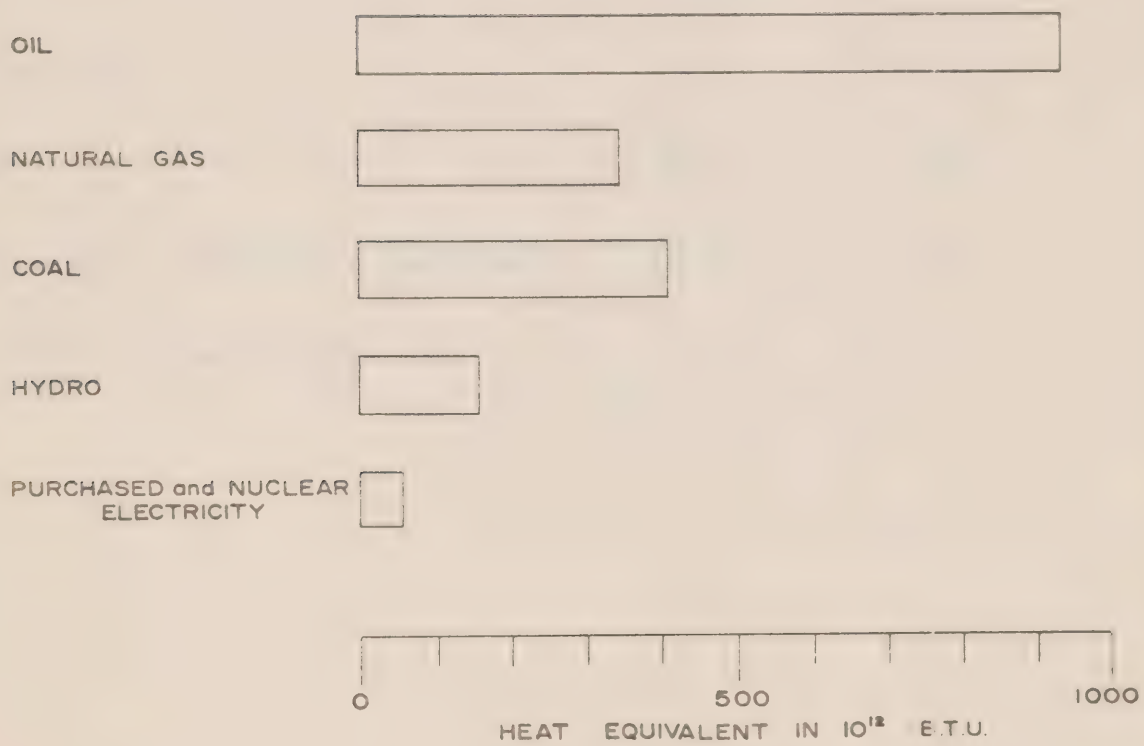


TABLE 1

Ontario Energy Consumption Annual Percent Increases

	<u>1968</u>	<u>1967</u>
Oil	5.6	4.9
Natural Gas	9.1	14.1
Coal	9.8	2.2
Electricity (primary & secondary)	7.6	8.4
TOTAL Primary Energy	7.1	5.0

Oil in Ontario

Ontario crude oil production continued to account for around one percent of total refinery requirements despite a 7 percent reduction of the former from the 1967 level. Crude oil from Western Canada increased over 6 percent because of expanded pipeline capability during the last four months of 1968. Refinery production increased by 5 percent, net product transfers from other provinces increased 23 percent and net product imports from the United States decreased 22 percent.

Total oil refinery capacity was increased nearly 9 percent in 1968 to keep pace with the increasing demand for petroleum products and the additional crude oil supplies made available from Western Canada.

Total oil products sales were nearly 152 million barrels, an increase of 5.7 percent over 1967. Ontario continued to account for over 30 percent of total product sales in Canada.

Table 2

Oil Balance 1968 (1)

<u>SUPPLY</u>	Quantities in Thousands of Barrels	<u>Percent</u>	
		<u>of Total</u>	<u>Change over 1967</u>
Crude Oil - Ontario Production (2)	1,151.	0.7	- 7.2
- From Western Provinces	118,740.	70.3	6.3
- Imports from Venezuela	470.	0.3	5.6
- Net Transfers & Other Materials	- 15.	-	-
- Total Run to Stills	120,346.	71.3	5.1
Products - Transfers from Other Provinces	36,939.	21.9	22.0
- Imports	8,039.	4.8	- 11.2
- Other Receipts	3,450.	2.0	64.2
- Total Product Receipts	48,428.	28.7	16.9
Total Supply	168,774.	100.0	8.2
<u>DISPOSITION</u>			
Consumption - Customer Sales	151,516.	89.8	5.7
- Company Use	9,133.	5.4	3.9
- Total Consumption	160,649.	95.2	5.6
Other - Transfers to Other Provinces	3,918.	2.3	14.6
- Exports	1,829.	1.1	70.5
- Product Inventory Changes	990.	0.6	-
- Losses	1,388.	0.8	-
- Total Other Disposition	8,125.	4.8	112.3
Total Disposition	168,774.	100.0	8.2

(1) Based on data from DBS Monthly Reports, No. 45-004.

(2) Crude oil, condensate and pentanes plus, comingled propane and butane mixes.

Table 3

Canadian Oil Requirements in Percent of Total for 1968

	<u>Ontario</u>	<u>Prairies & N.W.T.</u>	<u>Quebec & Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	25.0	15.7	-	8.6	49.3
Imported	0.1	-	36.9	-	37.0
Total	25.1	15.7	36.9	8.6	86.3
Net Product Imports	1.3	0.1	12.3	0.7	14.4
Provincial Transfers (1)	6.7	- 1.8	5.9	0.3	- 0.7
Total Consumption	33.1	14.0	43.3	9.6	100.0

(1) Product Transfers between provinces plus other materials to stills plus inventory changes.

Table 4

Ontario Net Sales of Petroleum Products, 1968 (1)

	<u>Quantities in Thousand Barrels</u>	<u>Percent of Total</u>
Propane & Propane Mixes (2)	1,114	0.7
Butane & Butane Mixes	70	-
Petro-chemical Feed Stock	6,353	4.2
Naphtha Specialties	1,333	0.9
Aviation Gasoline	253	0.2
Motor Gasoline	55,670	36.7
Aviation Turbo Fuel	3,573	2.4
Kerosene, Stove Oil, Tractor Fuel	3,358	2.2
Diesel Fuel Oil	9,151	6.0
Light Fuel Oil (No's 2 & 3)	38,085	25.1
Heavy Fuel Oil (No's 4, 5 & 6)	26,072	17.2
Asphalt	3,838	2.5
Coke	519	0.4
Lubricating Oil & Grease	1,887	1.3
Other Products	240	0.2
	<hr/>	<hr/>
Total All Products	151,516	100.0
	<hr/>	<hr/>

(1) Based on data from DBS Monthly Reports, No. 45-004

(2) Represents Ontario refinery production of crude oil only.

Table 5

ONTARIO REFINING CAPACITY

Primary Distillation Capacity at Year End
in Thousands of Barrels per Calendar Day.

		<u>1967</u>	<u>1968</u>
Shell:	Oakville	34.0	34.0
	Sarnia	40.0	40.0
B.A.:	Clarkson	55.4	55.4
B.P.:	Trafalgar	32.0	32.0
Imperial:	Sarnia	94.0	122.0
Texaco:	Port Credit	37.0	37.0
Sun Oil:	Sarnia	30.0	30.0
		<hr/>	<hr/>
Total	Ontario	322.4	350.4

Natural Gas in Ontario

Sales of natural gas to consumers during 1968 increased more than 10 percent and retained its ratio of around 40 percent of the total sales to consumers in Canada. Receipts of natural gas from Western Canada were unchanged to the end of October. Following completion of the new pipeline to Sarnia, substantial increases occurred, more than 50 percent in November and 45 in December over the same months in 1967. The higher inflow of Western gas permitted proportionate reductions in imports from the United States and nearly 3 percent greater deposits into storage. Gas used in transmission operations decreased although its ratio to total gas movements from Western Canada remained at around 9 percent. A decrease of some 15 percent in production from Ontario wells reduced its contribution to total requirements to around 3 percent from 4 percent in 1967.

The 10 percent sales increase represented a decline in growth from the 16 percent advance in 1967 but compares with a similar growth rate for 1966. Industrial users accounted for less than one percent of the total number of consumers but over 50 percent of the total sales in 1968. Industrial sales increased 14 percent, commercial sales 13 and residential sales 3 percent.

Canada's first large-scale natural gas liquefaction plant was commissioned in September at Hagar, 30 miles east of Sudbury. This facility permits the natural gas utility to liquefy and store natural gas during the low-demand summer periods for use in the peak winter periods.

TABLE 6

ONTARIO GAS BALANCE 1968

<u>Supply</u>		<u>Thousands Cubic Feet*</u>	<u>Percent</u>	
			<u>Of Total</u>	<u>Change Over 1967</u>
Ontario production		12,065,829	3.5	- 15.2
Receipts from:				
Western Canada	254,087,083		73.1	7.3
U.S.A.	<u>81,449,956</u>		23.4	15.8
		335,537,039		
Gas from storage (net)		96,995	-	N.A
Propane air		<u>11,032</u>	-	N.A
TOTAL SUPPLY		347,710,895	100.0	8.2
<u>Disposition</u>				
Sales to customers		308,100,295	88.6	10.3
Free gas	56,138			
Company use	<u>25,891,808</u>		7.4	- 3.7
		<u>25,947,946</u>		
TOTAL CONSUMPTION		334,048,241	96.0	9.1
Gas to province of Quebec (net)	3,736,638		1.1	14.3
Exports to U.S.A.	4,849,189		1.4	21.4
Metering, Line Loss & other unaccounted for	<u>5,076,827</u>		1.5	-
		<u>13,662,654</u>		
TOTAL DISPOSITION		347,710,895	100.0	8.2

* at 14.73 p.s.i.a.

TABLE 7 NATURAL GAS SALES IN ONTARIO 1968
COMPARATIVE TOTALS BY CUSTOMER CATEGORIES

Quantities in Thousands Cubic Feet

Category of Customer	1968 Number of Customers	Percent Changes 1968			
		over 1967		over 1963	
		Quantities	Number of Customers	Quantities	Number of Customers
Residential	691,494	91,665,862	+ 4.1	+ 3.0	+ 21.2
Commercial	62,570	57,510,124	+ 6.7	+ 13.1	+ 35.0
Industrial	7,486	158,924,309	+ 4.2	+ 14.0	+ 23.8
TOTALS	761,550	308,100,295	+ 4.3	+ 10.3	+ 22.3
					+ 47.8
					+ 156.3
					+ 91.0
					+ 83.7

Figure 3

NATURAL GAS SALES BY YEAR AND CATEGORY

Millions
of Mcf

350

300

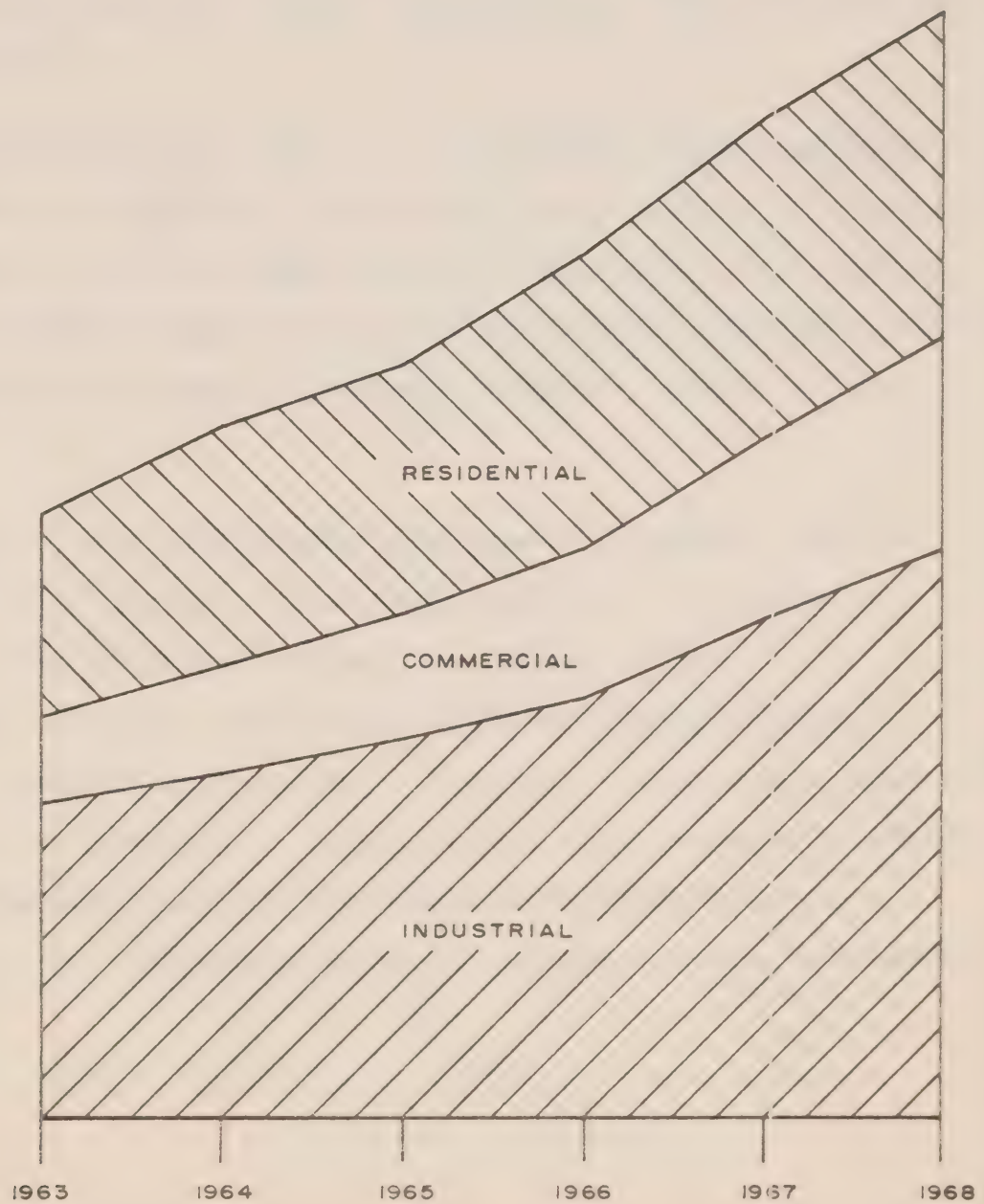
250

200

150

100

50



Coal in Ontario

The total receipts of coal, excluding coke, in Ontario in 1968 were about 67 percent of the total receipts in Canada, with Ontario accounting for the bulk of the net landed imports of coal into Canada.

Demand for anthracite and lignite is declining while bituminous coal demand is increasing due to greater participation of the latter in the industrial sector, primarily as a fuel for electricity generation.

Imported bituminous coal from the United States accounted for 93 percent of Ontario's total coal supply because of the ready availability of low-cost supplies to the Province's major demand centres. Remaining supplies were met by receipts from Nova Scotia with lesser amounts from the Western Provinces, mostly to the Lakehead.

In 1968, total coal demand increased 7.7 percent over the total for 1967. The most significant gain was a 15 percent increase in the industrial demand for Central Ontario (i.e. Metropolitan, Niagara, Upper Grand River and Georgian Bay). Total coal consumption increased 9.8 percent reflecting a substantial decrease in net inventory. Ontario Hydro alone consumed 6,085,796 tons of bituminous coal for the generation of electricity, representing over 60 percent of total coal consumption by industry.

Table 8

Ontario Coal Balance 1968

(in thousands of short tons, rounded to the nearest 1000)

Source - DBS Cat. No. 45-002

	Anthracite	(4) Bituminous	Lignite	1968 Total	% Change from 1967
<u>SUPPLY</u>					
Domestic: Western Provinces	-	58	159	217	- 30.2
Nova Scotia	-	1,038	-	1,038	- 1.2
Total	-	1,096	159	1,255	- 7.9
Imports: U.S.A.	176	15,804	-	15,980	9.2
Total Coal Supply	176	16,900	159	17,235	7.7
<u>DEMAND</u>					
Industrial: Consumption (1)	75	9,624	155	9,854	6.7
Net to Inventory (2)	- 1	257	1	257	- 51.7
Total Demand	74	9,881	156	10,111	3.5
Other (3): Total Demand	102	7,020	3	7,125	14.4
Total Coal Demand	176	16,901	159	17,236	7.7

(1) Industrial includes electric utilities, mining & manufacturing.

(2) Excludes stocks held by firms using less than 1000 tons per year and stocks held by coke producers.

(3) Retail to residential, commercial & small industrial users including railway, ship bunker, government & institutional consumption.

(4) Includes sub-bituminous in negligible quantities.

Table 9

Ontario Industrial Coal Consumption by Economic Regions

(in thousands of short tons, rounded to nearest 500)

	Anthracite	Bituminous	Lignite	1968	
				Total	% Change from 1967
<u>Economic Regions</u>					
Eastern Ontario	-	147.0	-	147.0	13.1
Lake Ontario	2.5	216.5	-	219.0	- 7.8
Central Ontario - Metropolitan, Niagara, Upper Grand R., Georgian Bay	52.0	6,459.0	-	6,511.0	15.1
Southern Ontario - Lake Erie, Lake St. Clair	20.0	1,712.5	-	1,732.5	- 9.9
Northeastern Ontario	-	834.0	-	834.0	10.8
Northwestern Ontario	-	255.0	155.0	410.0	- 23.6
<u>Total Ontario 1968</u>	74.5	9,624.0	155.0	9,853.5	6.7

Note: No sub-bituminous coal reported

Source: DBS Cat. No. 45-002

Electricity in Ontario

The total consumption of electricity in 1968 was 61 billion kilowatt-hours, an increase of 7.5 percent over 1967. In terms of end-use consumption, hydroelectricity provided for 62.7 percent of total consumption and thermal-electricity 29.5 percent compared to 66.3 and 25.4 respectively for 1967. The remainder was provided by electricity purchased from outside Ontario. Nuclear generation, though small, accounted for 886 million kilowatt-hours of electricity.

Hydro, or water power, continues to be the dominant source of electricity but the trend is favouring thermal generation, both conventional coal-fired plants and nuclear plants. In 1968 electrical generation from coal-fired generating stations increased 20 percent. Ontario Hydro brought one million kilowatts of new capacity on line which includes the last three units (900,000 KW) of the lakeview Generating station (coal-fired). The current Ontario Hydro commitment for new plant construction over the next 10 years provides for 5.2 million kilowatts of coal-fired thermal power and 653,000 kilowatts of water power. This additional capacity of nearly 11.9 million kilowatts represents an ultimate doubling of current capability, consistent with normal electrical load growth.

TABLE 10

ELECTRIC ENERGY BALANCE
1968 IN BILLIONS (10⁹) KWH

	ONTARIO (1)		OHEPJ (2)	
<u>SUPPLY</u>	(3)		(3)	
Utilities Generation - Hydro	36.7	(1.9)	35.1	(2.6)
- Thermal	16.7	(27.4)	15.9	(22.3)
- Total	53.4	(8.7)	51.0	(8.0)
Industry Generation - Hydro	1.6	(0)	-	-
- Thermal	1.3	(0)	-	-
- Total	2.9	(0)	-	-
Total Generation - Hydro	38.3	(1.8)	35.1	
- Thermal	18.0	(25.0)	15.9	
- Total	56.3	(8.2)	51.0	
Net Purchases	4.7	(0)	7.7	(4.0)
Total Supply	61.0	(7.5)	58.7	(7.5)
<u>DISPOSITION</u>				
Sales - Industrial	23.4	(8.8)		
- Commercial	6.9	(9.5)		
- Domestic & Farm	13.3	(7.2)		
- Street Lighting	0.4	(5.7)		
- Total Sales	44.0	(8.6)		
Own Plant Use	6.8	(3.0)		
Unallocated & Distribution by Non-respondents	10.2	(6.2)		
Total Disposition	61.0	(7.5)		

(1) DBS 57-002

(2) Ontario Hydro "Hydroscope" - 1968 Annual Report Supplement

(3) Percent increase over 1967.

Pipelines in Ontario

While pipeline systems in the Province continued to expand in response to greater demand in areas already serviced and to new demand areas not previously serviced, the most significant programs of expansion were in the vast networks of pipeline feeding natural gas and crude oil from Western Canada to Ontario.

The new 1000 mile 36 inch pipeline of Great Lakes Gas Transmission Company was completed in October. The additional supply of natural gas from Western Canada was immediately used to fulfill increased sales contracts between Trans Canada Pipe Lines Ltd. and Ontario's natural gas utilities. The net result has been the elimination of temporary imports of natural gas from the United States into Southern Ontario, the provision of natural gas to Sault Ste. Marie for the first time and, generally, provision for the continually escalating demand for energy in the Province.

Interprovincial Pipe Line Company concurrently completed the first stage of its second loop from Superior in Wisconsin to Sarnia. This stage of 464 miles of 34 inch pipe runs from Superior to the Chicago area. The second stage in the new loop, 200 miles from Chicago to Sarnia, is expected to be built by 1970. However, U.S. deliveries are already being routed through the new line. This diversion has resulted in increased transport of crude oil from Western Canada to Ontario's refineries through the main line between Superior and Sarnia.

Table 11

Pipeline Mileage in Ontario - 1968

	<u>Miles of Pipeline</u>
<u>Natural Gas Pipelines</u>	
Gathering and Transmission	4,669
Distribution	<u>14,425</u>
Total	19,094
 <u>Oil Pipelines</u>	
Crude Oil Trunk Lines	289
Oil Product Lines	<u>870</u>
Total	1,159
 <u>Total All Pipelines</u>	<u><u>20,253</u></u>

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TABLE OF CONTENTS

Page No.

Highlights				1
Primary Energy Consumption in Ontario				2
Percent Breakdown	-	Figure 1		3
By Source in BTU's	-	Figure 2		4
Annual Percent Increases	-	Table 1		5
Oil in Ontario				6
Oil Balance Sheet	-	Table 2		8
Canadian Oil Requirements	-	Table 3		9
Sales of Petroleum Products	-	Table 4		10
Oil Refineries	-	Table 5		11
Natural Gas in Ontario				12
Gas Balance Sheet	-	Table 6		14
Sales 1969	-	Table 7		15
Sales 1964-1969	-	Figure 3		16
Pipelines in Ontario				17
Pipeline Mileage	-	Table 8		18
Coal in Ontario				19
Coal Balance Sheet	-	Table 9		21
Consumption by Industrial Consumers		Table 10		22
Electricity in Ontario				23
Electric Energy Balance	-	Table 11		24

HIGHLIGHTS

Total energy consumed in Ontario increased 3 percent over 1968. Natural gas showed the greatest advance of individual fuels with a 12 percent increase gained mainly at the expense of coal, although the latter continued as the dominant fuel for thermal generation of electricity.

The energy sector featured other natural gas developments of a 14 percent sales increase, 38 percent more Western gas receipts, greater use of storage facilities, and a drop of 60 percent in gas imported from the U.S.A.

Ontario's crude oil and natural gas producing industries during the year included a high output rate for oil, a notable increase in drilling, a major advance in gas production from Lake Erie, more activity in the Hudson Bay Lowlands and some important discoveries.

Crude oil received from Western Canada increased 5 percent due to greater pipeline facilities. Refinery output advanced 4 percent, while imported oil products were relatively stable over 1968.

During 1969, over 34,000 inspections were made of natural gas and fuel oil pipelines, and natural gas, propane and fuel oil appliances.

PRIMARY ENERGY CONSUMPTION IN ONTARIO 1969

Primary energy consumption is definable as the input or consumption of the initial energy source, including energy lost in the transformation process. The accepted measure of each energy's share of the total energy package is to convert each to its heat equivalent measured in British Thermal Units (BTU). The accompanying charts illustrate the relative magnitude of primary energy consumption in Ontario during 1969 on an estimated basis.

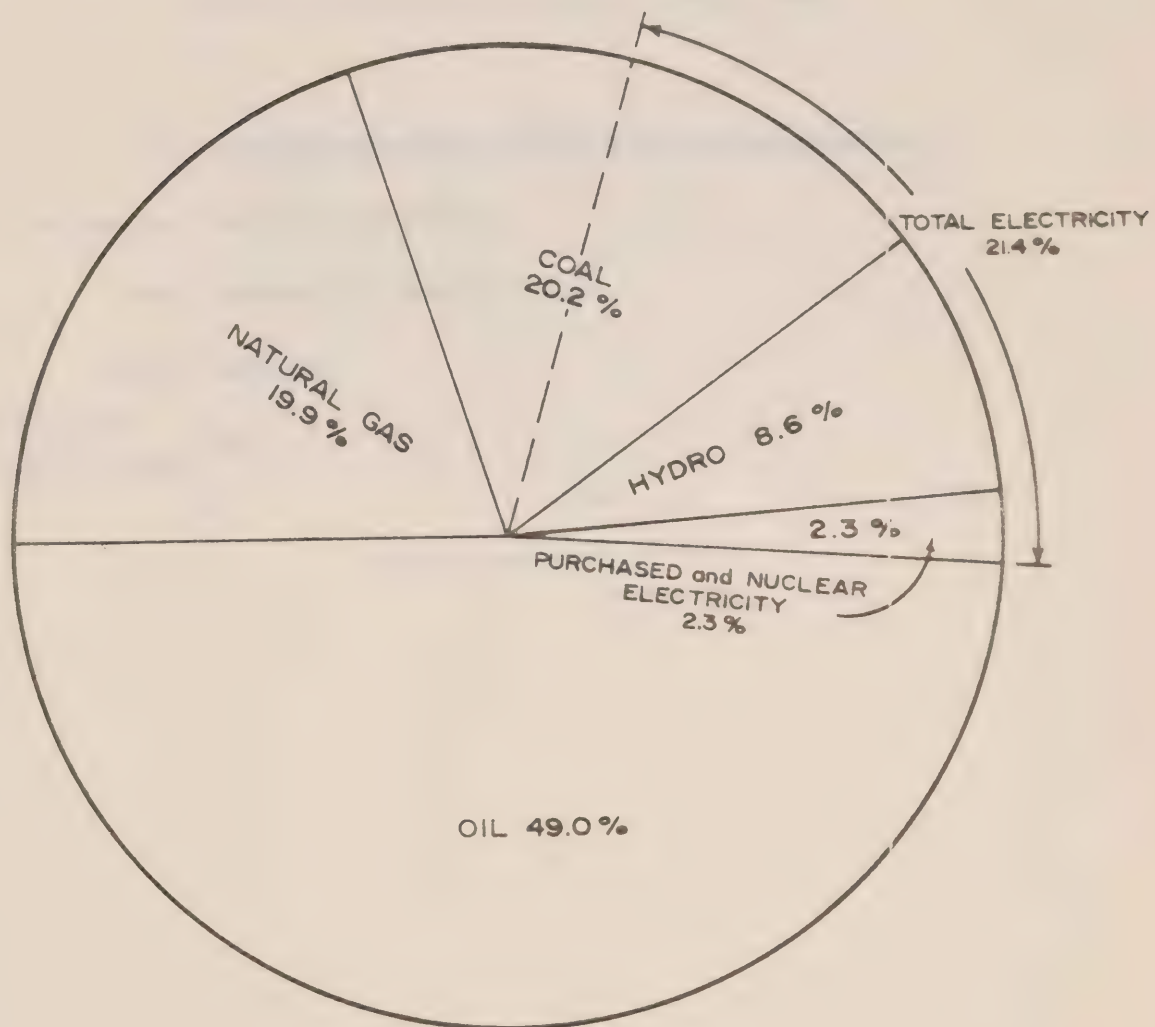
Total primary energy consumption during 1969 exceeded 1,900 x 10¹² BTU, a 3 percent increase compared to the 1968-67 advance of 7 percent.

Natural gas gained in the energy sector mainly at the expense of coal and oil, although the latter continued as a dominant energy source. Coal's position eased over 1968, although continuing its major use in electrical generation.

Primary electricity from water and nuclear power contributed over 10 percent of total energy consumption.

Figure 1

PRIMARY ENERGY CONSUMPTION BY SOURCE
AS PERCENT OF TOTAL CONSUMPTION FOR 1969



PRIMARY ENERGY CONSUMPTION IN ONTARIO-1969

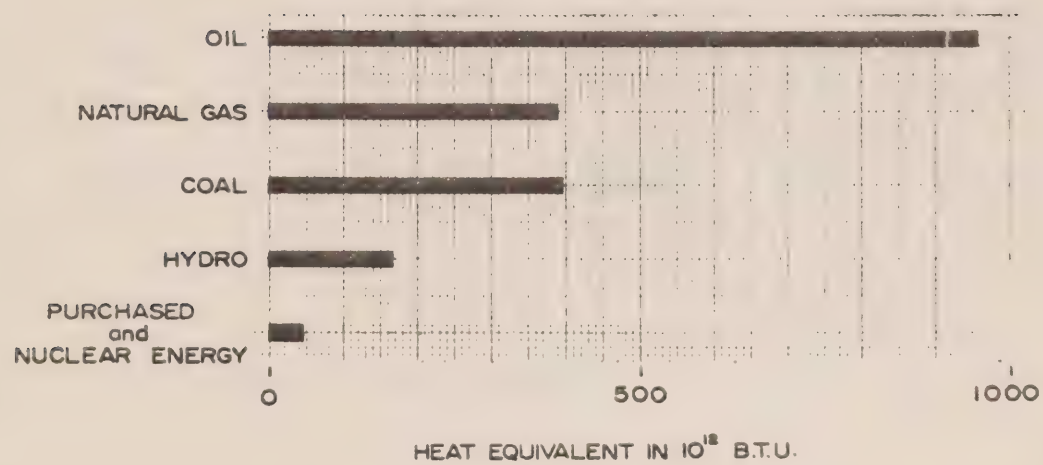


Table 1

Ontario Energy Consumption Annual Percent Increases

	<u>1969</u>	<u>1968</u>
Oil	2.7	5.6
Natural Gas	12.5	9.1
Coal	- 3.6	9.8
Electricity (primary & secondary)	10.1	7.6
TOTAL Primary Energy	3.0	7.1

Oil in Ontario

Crude oil produced from Ontario wells accounted for less than 1 percent of total refinery requirements despite a 1 percent increase in output over 1968. Ontario crude output has been declining relatively with advancing extra-provincial supplies. Crude oil from Western Canada increased more than 5 percent because of expanded pipeline capability during the year.

Refinery production advanced nearly 4 percent, net product transfers from other provinces decreased nearly 3 percent while net product imports were relatively unchanged over 1968. Total oil refinery capacity was increased more than 3 percent in 1969 to meet the growing demand for petroleum products and provide for the additional crude needed from Western Canada.

Sales of all products exceeded 155 million barrels, an increase of 2.6 percent over 1968, continuing their level of over 30 percent of the all-Canada total. Percent proportions of the four dominant products accounting for nearly 85 percent of total sales in Ontario and rates of change over 1968 were as follows:

<u>PRODUCT</u>	<u>Percent</u>	
	<u>Total Product Sales</u>	<u>Changes over 1968</u>
Motor Gasoline	36.9	2.8
Light Fuel Oil	24.3	0.8
Heavy Fuel Oil	16.6	- 1.5
Diesel Fuel Oil	6.5	8.1
Three Fuel Oils	47.3	0.9
All Four Fuels	84.2	1.7

Consumption of fuel oils is expected to increase substantially in the near future mainly in the thermal generation of electricity compared with their minor but increasing use in this way over the past few years. Light and diesel oils mainly have been burned, of which 1969 light oil volumes were 50 percent over 1968 but both accounted for around 1 percent of total consumption of these two fuels. Because of the accentuated need to reduce air pollution, oils having the lowest sulphur content are being sought from Western Canada and other sources.

One of the major new projects to consume fuel oil is the Lennox generating plant at Bath near Kingston on which construction is to commence in late 1970, first power is due in 1974, and to be completed in 1977. Each of the four units of this 2.2 million kilowatt plant will burn around 27,300 gallons of residual fuel oil per hour at full operation. At this location, transport charges for oil are cheaper than coal from the U. S. mines which are experiencing demand in excess of supply because of labour and other problems affecting the reliability of adequate coal from this source. In addition, the ash pollutant content of oil is lower than coal. Applications of this type and size undoubtedly will result in considerably increased demand and stepped up growth rates for these fuels.

Table 2

Ontario Oil Balance 1969 (1)

	Quantities in Thousands of Barrels	Percent of Total	Percent Change over 1968
<u>SUPPLY</u>			
Crude Oil - Ontario Production (2)	1,162.	0.7	1.0
- From Western Provinces	123,493.	71.2	4.0
- Imports from Venezuela	422.	0.2	- 10.2
- Net Transfers & Other Materials	12.	-	-
- Total Run to Stills	125,089.	72.1	3.9
Products - Transfers from Other Provinces	36,865.	21.2	- 0.2
- Imports	8,452.	4.9	5.1
- Other Receipts	3,119.	1.8	- 9.6
- Total Product Receipts	48,436.	27.9	-
Total Supply	173,525.	100.0	2.8

DISPOSITION

Consumption - Customer Sales	155,435.	89.6	2.6
- Company Use	8,251.	4.7	- 9.7
- Total Consumption	163,686.	94.3	1.9
Other - Transfers to Other Provinces	4,761.	2.7	21.5
- Exports	2,229.	1.3	21.9
- Product Inventory Changes	1,516.	0.9	- 52.5
- Losses	1,333.	0.8	- 4.0
- Total Other Disposition	9,839.	5.7	21.1
Total Disposition	173,525.	100.0	2.8

(1) Based on data from DBS Monthly Reports, No. 45-004.

(2) Crude oil, condensate and pentanes plus, comingled propane and butane mixes.

Table 3

Canadian Oil Requirements in Percent of Total for 1969

	<u>Ontario</u>	<u>Prairies & N.W.T.</u>	<u>Quebec & Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	24.7	15.7	-	7.7	48.1
Imported	0.1	-	37.8	-	37.9
Total	24.8	15.7	37.8	7.7	86.0
Net Product Imports	1.2	-	11.3	1.3	13.8
Provincial Transfers (1)	6.2	- 1.7	- 5.0	0.7	0.2
Total Consumption	32.2	14.0	44.1	9.7	100.0

(1) Product Transfers between provinces plus other materials to stills plus inventory changes.

Table 4

Ontario Net Sales of Petroleum Products, 1969 (1)

	<u>Quantities in Thousand Barrels</u>	<u>Percent of Total</u>
Propane & Propane Mixes (2)	1,214	0.8
Butane & Butane Mixes	9	-
Petro-chemical Feed Stock	6,948	4.5
Naphtha Specialties	1,467	0.9
Aviation Gasoline	304	0.2
Motor Gasoline	57,566	37.0
Aviation Turbo Fuel	4,000	2.6
Kerosene, Stove Oil, Tractor Fuel	3,506	2.3
Diesel Fuel Oil	10,171	6.5
Light Fuel Oil (Nos. 2 & 3)	37,777	24.3
Heavy Fuel Oil (Nos. 4, 5 & 6)	25,757	16.6
Asphalt	3,931	2.5
Coke	409	0.3
Lubricating Oil & Grease	2,074	1.3
Other Products	302	0.2
	<hr/>	<hr/>
Total All Products	155,435	100.0
	<hr/>	<hr/>

(1) Based on data from DBS Monthly Reports, No. 45-004

(2) Represents Ontario refinery production from crude oil only.

Table 5

ONTARIO REFINING CAPACITY

Primary Distillation Capacity at Year End
in Thousands of Barrels per Calendar Day.

		<u>1968</u>	<u>1969</u>
Shell:	Oakville	34.0	36.0
	Sarnia	40.0	47.0
Gulf:	Clarkson	55.4	55.4
B.P.:	Trafalgar	32.0	32.0
Imperial:	Sarnia	122.0	122.7
Texaco:	Port Credit	37.0	37.0
Sun Oil:	Sarnia	<u>30.0</u>	<u>32.0</u>
Total Ontario		350.4	362.1

Natural Gas in Ontario

Consumption of natural gas in Ontario during 1969 increased over 12 percent compared with 9 in 1968. Gas receipts from Western Canada increased nearly 38 percent reflecting the extent of the resultant greater supply in the initial full year following completion of the new pipeline through the U.S.A. during the latter part of 1968.

The higher influx of Canadian gas enabled a reduction of nearly 60 percent in imports from the U.S.A. Because of the increased demand, considerable supplies were diverted almost directly to distribution services during both peak demand periods instead of being injected into storage while withdrawals from storage increased 15 percent. Despite this trend, injections advanced 12 percent. Gas used in transmission operations decreased over 7 percent while its ratio to total Western gas receipts dropped to nearly 7 from 10 percent in 1968. A decrease of 7 percent in production from Ontario wells, combined with the considerable advance in gas from the western provinces, further reduced its relatively declining contribution to provincial requirements to under 3 percent from nearly 4 in 1968.

Sales of natural gas to consumers in Ontario increased more than 14 percent compared with 10 in 1968 and advanced their ratio of total sales in Canada to over 42 percent from 40 that year. Industrial users comprised slightly over 2 percent of all customers but accounted for over 50 percent of total sales. Commercial sales reflected the highest increase and combined residential and commercial sales advanced nearly 13 percent. Individually, industrial sales with the largest volume increased over 15 percent, commercial nearly 25 and residential over 5 percent.

Exports to the U. S. A. more than doubled those of 1968. While supplies to northeastern New York State increased more than 40 percent, exports of gas through southwestern Ontario, initially commencing during 1969, accounted for the major bulk of the exports increase.

New uses for natural gas have been developing mainly stemming from the need to reduce air pollution. During 1969, industrial gas sales included relatively small volumes for electrical power generation, continuing a similar trend over the past few years. Indications are that this relatively clean-burning fuel will be used to a greater degree for this purpose as pollution abatement programs are stepped up by government and industry. For the same reason, experimentation in using compressed and liquefied natural gas in motor vehicles and other means of transport is continuing in Ontario and other localities.

TABLE 6

ONTARIO GAS BALANCE 1969

<u>Supply</u>	<u>Thousands Cubic Feet*</u>	<u>Percent</u>	
		<u>Of Total</u>	<u>Change over 1968</u>
Ontario production	11,237,888	2.8	- 6.9
Receipts from:			
Western Canada	349,998,101	88.1	37.7
U. S. A.	<u>34,823,261</u>	<u>8.8</u>	- 57.2
	384,821,362	99.7	
Gas from storage (net)	1,360,906	0.3	N.A
Propane air	<u>2,177</u>	--	N.A
	<u>397,422,333</u>	<u>100.0</u>	
<u>Disposition</u>			
Sales to consumers	351,728,701	88.5	14.2
See gas	44,998		
Company use	<u>23,920,731</u>		
	<u>23,965,729</u>	<u>6.0</u>	- 7.6
Total Consumption	375,694,430	94.5	12.5
Gas to Province of Quebec (net)	1,980,646	0.5	- 47.0
Exports to U. S. A.	16,460,009	4.1	3.4 times
Metering, line loss & other unaccounted for	<u>3,287,248</u>	0.9	
	<u>21,727,903</u>		
Total Disposition	<u>397,422,333</u>	<u>100.0</u>	

TABLE 7 NATURAL GAS SALES IN ONTARIO 1969
COMPARATIVE TOTALS BY CUSTOMER CATEGORIES

Quantities in Thousands Cubic Feet

Category of Customer	Number of Customers	Quantities	Percent Changes			
			over 1968	over 1969	over 1964	over 1964
			Number of Customers	Quantities	Number of Customers	Quantities
Residential	713,606	96,726,560	3.2	5.5	17.5	40.3
Commercial	65,731	71,676,026	5.0	24.6	34.0	2.5 times
Industrial	8,066	183,326,115	7.7	15.4	26.7	91.9
TOTALS	787,403	351,728,701	3.4	14.2	18.8	82.3

Figure 3

NATURAL GAS SALES BY YEAR AND CATEGORY

Millions
of Mcf

400

350

300

250

200

150

100

50

RESIDENTIAL

COMMERCIAL

INDUSTRIAL

1964

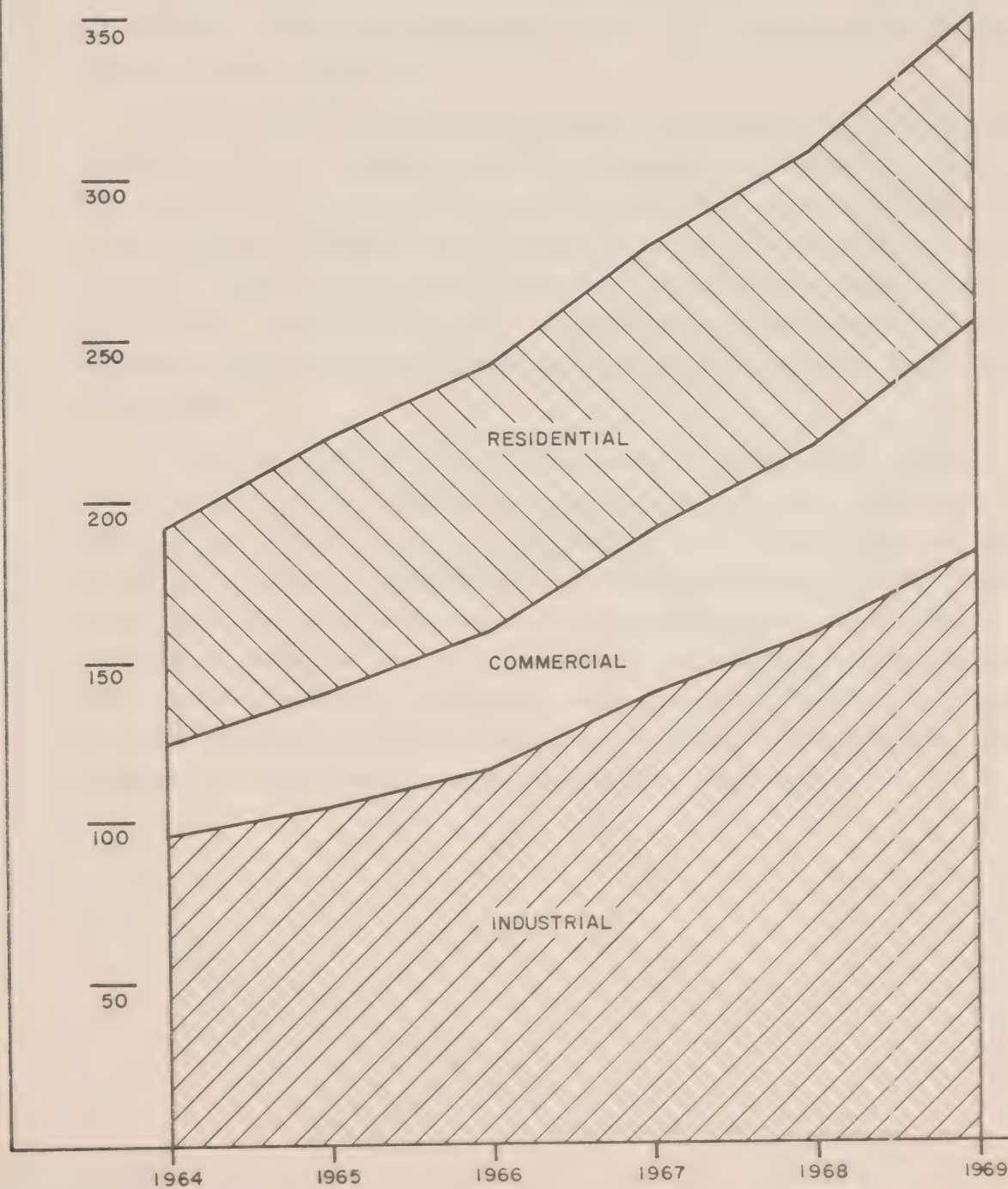
1965

1966

1967

1968

1969



Pipelines in Ontario

Pipelines operated in Ontario for the transportation of gas and oil continued to expand in response to greater demand in existing areas of distribution and in new sectors especially for natural gas.

The major pipeline completed through the U.S.A. to Sarnia during late 1968 continues to provide increasingly greater supplies of natural gas from Western Canada, substantial advances in sales, and an expanding market for this energy source. The inflow from this source reduced dependance upon U.S. imports and caused a major drop in such supplies.

Pipelines expanded with market development. Distribution lines increased over 4 percent with comparable advances in both the northern and southern Ontario sectors. While gathering lines from producing wells in the province changed little, transmission increased around 3 percent of which those of Trans-Canada Pipe Line compared with 1968. During the year, Trans-Canada upgraded its northern Ontario lines by sand-blasting, thereby improving their throughput capability.

Interprovincial Pipe Line Company completed, during 1969, the final phase of its 460-mile second loop between Superior, Wisconsin, and Sarnia. This stage of 290 miles of 30-inch pipe extends from Griffith, Indiana, completing the Chicago-Sarnia link. 1969 additions included construction of seven miles of 30-inch line within Ontario and increases in pumping and storage facilities at new and existing pumping stations. As a result, crude oil transported from Western Canada to refineries in Ontario increased considerably through the main line between Superior and Sarnia.

Table 8

Pipeline Mileage in Ontario - 1969

	<u>Miles of Pipeline</u>
<u>Natural Gas Pipelines</u>	
Gathering	1,194
Transmission	3,512
Distribution	<u>15,027</u>
Total	19,733
<u>Oil Pipelines</u>	
Crude Oil Trunk Lines	296
Oil Product Lines	<u>870</u>
Total	1,166
Total All Pipelines	<u><u>20,899</u></u>

Coal in Ontario

The coal situation in Ontario during 1969 was featured by decreased receipts from the U.S.A. and other provinces and a relatively stable increase in its use for generation of electricity. Ontario accounted for around 60 percent of total coal receipts in Canada including the major bulk of landed imports from the U.S.A.

Total coal demand in the province decreased 5 percent compared with a 1968-67 increase of nearly 8 percent. Requirements for bituminous coal imported from the U.S.A. declined slightly compared with a 9 percent advance in the preceding year and despite an overall 2 percent increase in its prime industrial use as fuel for thermal generation of electricity. Imported coal accounted for over 95 percent of Ontario's coal supply which compares with 1968. Stocks of coal on hand at the close of 1969 were slightly higher than 1968 in the major generation areas of southern Ontario using the bulk of imports.

The demand for anthracite and lignite continues to decline. Along with decreases in receipts from Western provinces, bituminous coal from Nova Scotia dropped over 60 percent continuing a similar trend from 1968.

A significant increase in industrial use occurred in the Central Ontario Region but the advance of 5 percent represented an actual decline over the 1968 increase of 15 percent. In the Southern Ontario Region of Lakes Erie and St. Clair, an advance of 12 percent reversed a 1968 decrease of nearly 10 percent but on considerably lower volumes than in Central Ontario. The net advance in industrial use in these two major consuming regions combined was 7 percent which compares with 1968.

The share of total electricity consumed in Ontario contributed by thermal generation (mainly coal-fired) increased to 10.5 percent from 9 in 1968 while total electricity's 20.4 percent share of primary energy consumption changed little over 1968. The combination of decreased growth in industrial use of coal over 1968, lesser supplies and higher year-end inventories would indicate a levelling-off in its use for electrical generation despite the relatively steady growth in demand for electricity. Consequently, a trend toward use of other hydrocarbons for electrical generation appears to be developing, particularly in the interests of reducing air pollution.

The major coal fields in Alberta and British Columbia account for the major bulk of Canada's recoverable reserves of 49 billion tons, of which sizeable quantities are destined at the present time for export to Japan. Of particular interest to Ontario, a major producer (Kaiser Resources Ltd.) is looking toward the steel industry in Eastern Canada as an outlet for competing with coal imports from the U.S.A. in that market. To that end, an experimental shipment of 200,000 tons is being moved by rail to the Head of the Lakes and ship to Hamilton for conversion to coke and use by the Steel Co. of Canada to determine the economic feasibility of further sales in the Ontario market.

Table 9

Ontario Coal Balance 1969

(in thousands of short tons, rounded to the nearest 1000)

Source - DBS Cat. No. 45-002

	Anthracite	(4) Bituminous	Lignite	1969 Total	% Change from 1968
<u>SUPPLY</u>					
Domestic: Western Provinces	-	39	129	168	- 22.6
Nova Scotia	-	365	-	365	- 64.9
Total	-	404	129	533	- 57.7
Imports: U.S.A.	152	15,682	-	15,834	- 0.9
Total Coal Supply	152	16,086	129	16,367	- 5.1
<u>DEMAND</u>					
Industrial: Consumption (1)	59	9,902	128	10,089	2.4
Net to Inventory (2)	1	- 3	1	- 1	-
Total Demand	60	9,899	129	10,088	0.2
Other (3): Total Demand	92	6,187	-	6,279	- 11.9
Total Coal Demand	152	16,086	129	16,367	- 5.1

(1) Industrial includes electric utilities, mining & manufacturing.

(2) Excludes stocks held by firms using less than 1000 tons per year and stocks held by coke producers.

(3) Retail to residential, commercial & small industrial users including railway, ship bunker, government & institutional consumption.

(4) Includes sub-bituminous in negligible quantities.

Table 10

Ontario Industrial Coal Consumption by Economic Regions

(in thousands of short tons, rounded to nearest 500)

Economic Regions	Anthracite		Bituminous ⁽¹⁾		Lignite		1969	
							Total	% Change from 1968
Eastern Ontario	-		74.0		-		74.0	- 49.7
Lake Ontario	-		184.8		-		184.8	- 15.6
Central Ontario - Metropolitan, Niagara, Upper Grand R., Georgian Bay	59.5		6,810.3		-		6,869.8	5.5
Southern Ontario - Lake Erie, Lake St. Clair	-		1,947.9		-		1,947.9	12.4
Northeastern Ontario	- (2)		626.0		-		626.0	- 25.0
Northwestern Ontario	-		258.7		127.7		386.4	- 5.8
Total Ontario 1969	59.5		9,901.7		127.7		10,088.9	2.3

Note: 1. Negligible quantities of sub-bituminous coal are included in bituminous

2. Northeastern Ontario consumed a minor volume of anthracite

Source: DBS Cat. No. 45-002

Electricity in Ontario

Total consumption of electricity of 64 billion kilowatt-hours (kwh) in 1969 increased 5.9 percent over 1968. On end-use consumption, hydro-electricity provided 62 percent of the total and thermal-electricity 31.9 percent compared to 62.8 and 29.5 respectively for 1968. The balance was provided by supplies from outside the province. Nuclear generation, although relatively minor, accounted for 494 million kwh, a decrease of 44 percent over the previous year.

Hydro-electricity generated from water power continues to dominate Ontario's electrical supply but the trend is favouring thermal generation, both conventional coal-fired plants as well as oil-fired and nuclear installations. In 1969, generation from coal-fired thermal plants increased over 20 percent. The current Ontario Hydro commitment for new plant construction provides for a further 13.2 million kw by the end of 1978 most of which (12.7 million) will come from five thermal stations, two of which will be nuclear. This additional capacity will more than double current capability.

Ontario Hydro brought 1.2 million kw of new capacity on line in 1969 which includes two 500,000 kw units of the 2,000,000 kw coal-firing Lambton station. Hydro plant additions included extensions of existing plants on the Madawaska and Mississauga Rivers and three new transformer stations. Construction is proceeding on the Nanticoke (coal-fired) plant where first steam is expected in late 1971. Studies for the new Lennox oil-fired plant near Kingston were completed with first power planned for 1975.

The Douglas Point 200 megawatt nuclear power station experienced problems with fuelling and maintaining heavy water control which necessitated a temporary shut-down during the early months of the year. On-power fuel tests, to avoid having to shut down for re-fuelling, indicated reasonable measures of success which should enable improved output from this plant. Construction at the Pickering nuclear plant was highlighted during the year by completion of units one and two with starts made on the remaining two units and deliveries of fuel bundles for the initial charge. Site-clearing for the new 3,200,000 kw Bruce nuclear plant also commenced, along with A.E.C.L.'s heavy water plant designed to produce 800 tons per year by 1972.

TABLE 11

ELECTRIC ENERGY BALANCE

1969 IN BILLIONS (10^9) KWH

		<u>ONTARIO (1)</u>		<u>OHEPC (2)</u>	
<u>SUPPLY</u>		(3)		(3)	
Utilities Generation	- Hydro	38.4	(4.6)	36.7	(4.6)
	- Thermal	19.3	(15.6)	18.9	(18.9)
	- Total	57.7	(8.0)	55.6	(9.0)
Industry Generation	- Hydro	1.7	(0)	-	-
	- Thermal	1.3	(0)	-	-
	- Total	3.0	(0)	-	-
Total Generation	- Hydro	40.1	(4.7)	36.7	
	- Thermal	20.6	(14.4)	18.9	
	- Total	60.7	(7.8)	55.6	
Net Purchases		3.9	(-17.0)	6.9	(-10.4)
Total Supply		64.6	(5.9)	62.5	(6.5)
<hr/>					
<u>DISPOSITION</u>					
Sales	- Industrial	25.4	(10.0)		
	- Commercial	7.7	(11.6)		
	- Domestic & Farm	14.1	(6.0)		
	- Street Lighting	0.4	(0)		
	- Total Sales	47.6	(8.2)		
Own Plant Use		6.7	(-1.5)		
Unallocated & Distribution by Non-respondents		10.3	(-1.0)		
Total Disposition		64.6	(5.9)		

(1) DBS 57-001

(2) Ontario Hydro "Hydroscope" - 1969 Annual Report Supplement

(3) Percent increase over 1968.

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Table of Contents

	<u>Page No.</u>
Highlights	1
Primary Energy Consumption in Ontario	2
Percent Breakdown - Figure 1	3
By Source in BTU's - Figure 2	4
Annual Percent Increases - Table 1	5
Oil in Ontario	6
Oil Balance Sheet - Table 2	9
Canadian Oil Requirements - Table 3	10
Sources of Refined Products- Table 4	11
Sales of Products - Table 5	12
Oil Refineries - Table 6	13
Natural Gas in Ontario	14
Gas Balance Sheet - Table 7	17
Sales 1970 - Table 8	18
Sales 1965-1970 - Figure 3	19
Propane in Ontario	20
Propane Receipts and Disposition - Table 9	22
Pipelines in Ontario	23
Pipeline Mileage - Table 10	24
Coal in Ontario	25
Coal Balance Sheet - Table 11	28
Consumption by Industrial Consumers - Table 12	29
Electricity in Ontario	30
Electric Energy Balance - Table 13	33

Highlights 1970

Total energy consumed in Ontario increased 9 percent in 1970 compared to 3 percent in 1969. Natural gas, coal and electricity showed the greatest advance of individual fuels with 15, 11 and 11 percent increases respectively, gained at the expense of oil and hydro-electricity. Although its consumption increased at a lower rate, oil continued to be the dominant fuel, particularly in the transportation and space heating fuel markets.

Crude oil received from Western Canada and refinery production increased by 8 percent, while net product imports decreased by 20 percent. Production of crude oil from wells in the Province decreased and continued to represent less than 1 percent of total demand.

Natural gas receipts from Western Canada were higher by 30 percent, with an accompanying decrease of nearly 70 percent in imports from the United States. Gas storage increased substantially and production of gas from Ontario wells increased nearly 50 percent, providing over 3 percent of total requirements.

The consumption of electricity increased by 7 percent in terms of kilowatt-hours while the primary energy input to produce this electrical output increased 11 percent because of a 20 percent increase in thermal generation and a reduction of over 2 percent in hydraulic generation. This increasing emphasis on thermal generation resulted in a commensurate increase in coal consumption.



Primary Energy Consumption in Ontario 1970

The consumption of primary energy supplies in Ontario, much of which comes from extra-provincial sources, reflected changes over 1969, both in total and shifts between dominant types of energy source. The relative extent of primary energy consumed in the province during 1970 on an estimated basis is shown in the accompanying charts.

Total primary energy consumed during 1970 was in excess of $2,130 \times 10^{12}$ BTU, which represents an advance of over 9 percent compared to a 1969/68 increase of 3 percent.

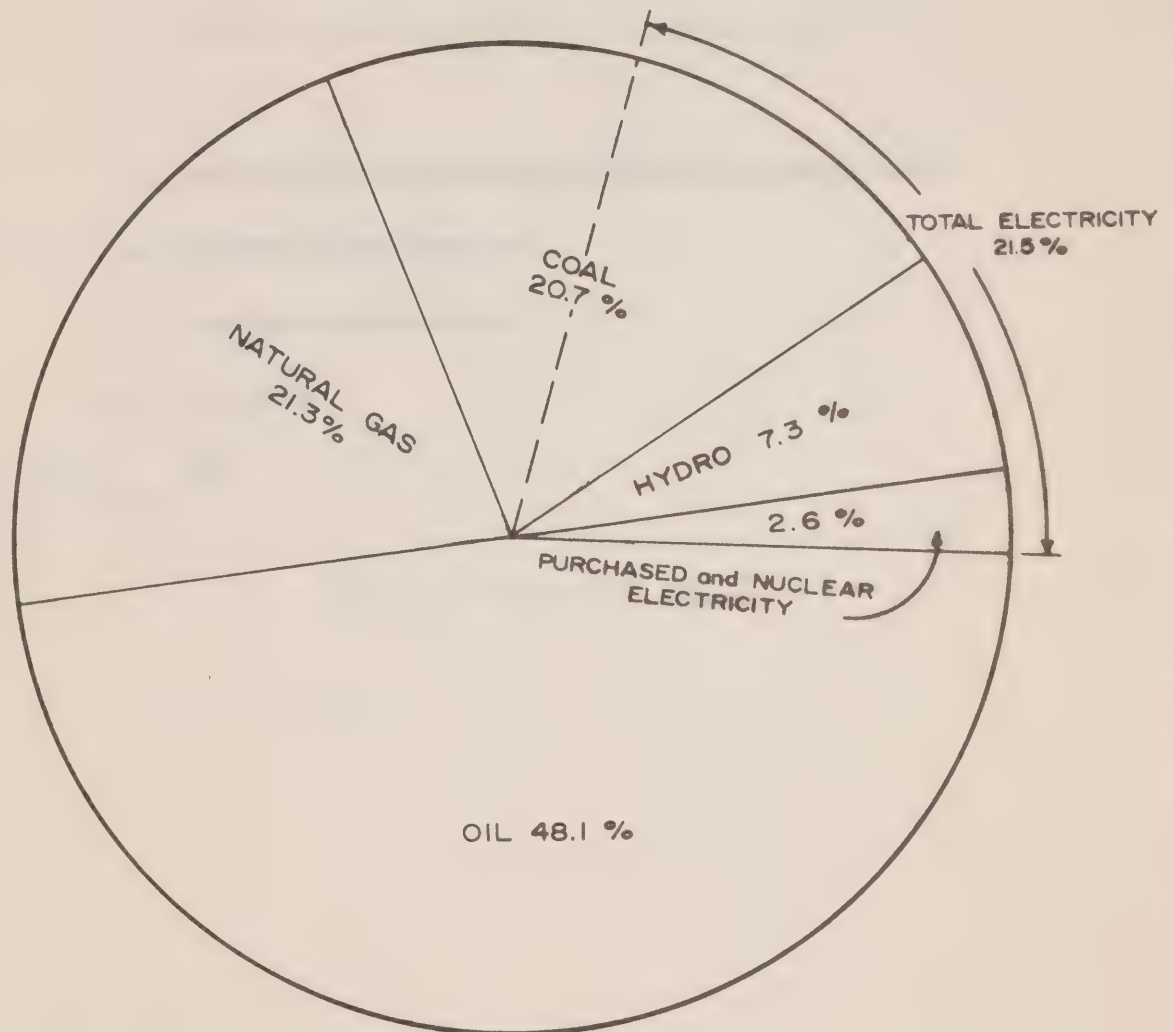
The natural gas share of the total energy picture increased while decreased proportions came from oil and hydro-electricity. Although oil continued as the major energy source, coal improved mainly because of greater use for thermal generation of electricity which increased nearly 20 percent in 1970. Electricity from hydraulic and nuclear power, including net extra-provincial purchases, provided nearly 10 percent of total primary energy consumption compared to almost 11 percent in 1969.

The dramatic increase in total energy consumption may be attributed to significant increases in non-fuel use (petrochemical feedstock, metallurgical reduction processes), air conditioning, electric heating and the increasing displacement of direct fuels by electricity. In the latter case, the net increase in energy inputs is nearly tripled because of the roughly one-third thermal efficiency in power generation.



Figure 1

PRIMARY ENERGY CONSUMPTION BY SOURCE
AS PERCENT OF TOTAL CONSUMPTION FOR 1970





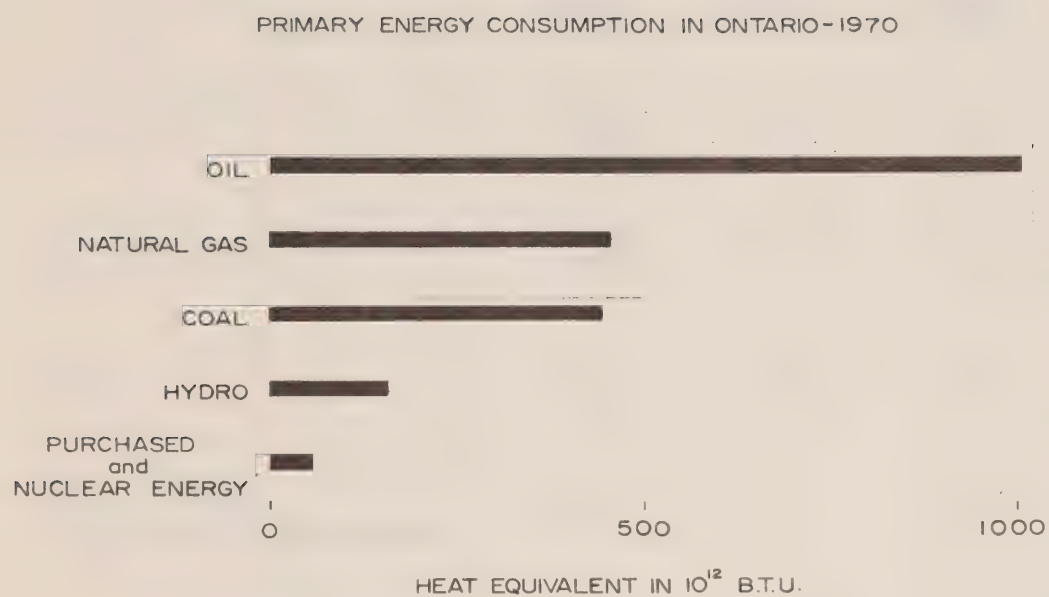




Table 1

Ontario Energy Consumption Annual Percent Increases

	<u>1970</u>	<u>1969</u>	<u>1968</u>
Oil	7.3	2.7	5.6
Natural Gas	14.9	12.5	9.1
Coal	11.4	- 3.6	9.8
Electricity (primary & secondary)	11.2	10.1	7.6
TOTAL Primary Energy	9.6	3.0	7.1

Oil in Ontario

Crude oil received in Ontario from Western Canada increased over 1969, accompanied by higher refinery production and consumption. Production of crude from wells in the province decreased and continued to provide less than one percent of total demand.

Receipts of Western Canada crude increased over 8 percent mainly resulting from an advance of 20 percent in those from Alberta which was offset by decreases of nearly 9 percent in supplies from Saskatchewan and of 10 percent from Manitoba. The ratios of Ontario receipts from Western Canada were over 60 percent from Alberta, 34 from Saskatchewan and nearly 3 percent from Manitoba, compared with 1969 ratios of 57, 40 and over 3 percent respectively.

Product output from Ontario refineries increased over 8 percent accompanying a 2 percent increase in capacity over 1969. Net product transfers from other provinces mainly Quebec advanced 12 percent, while net product imports decreased nearly 20 percent over the preceding year.

Sales of refined products in total increased over 8 percent compared with a 1969-68 increase of 2 percent, and accounted for over 32 percent of the total for Canada. Sales increases by major products were motor gasoline nearly 5, light fuel oil 8, heavy oil 15 and diesel nearly 9 percent with these four accounting for nearly 85 percent of total sales as for 1969. Corresponding 1969-68 changes were motor gasoline up over 3 percent, light and heavy down slightly and diesel up 5 percent.



The consumption of fuel oil is expected to increase substantially from 1971 onward. During 1970, fuel oils used in thermal generation doubled over 1969 although comprising less than one percent of total consumption. A significant new user of heavy fuel oil will be the Bruce heavy water plant at Douglas Point for producing the extensive volumes of steam needed in its operations. Under a five-year contract commencing in the Fall 1971, Imperial Oil Limited will transport heavy oil from its Montreal refinery in the world's first oil unit train of jumbo cars to Douglas Point at the rate of over 700,000 gallons initially on every three-day round trip.

A major future user of heavy fuel oil for thermal generation of electricity will be the new Lennox plant being constructed near Kingston, from which first power output is expected in 1974. When completed in 1977, consumption is expected to be around 12,000,000 barrels per year. While other similar projects where oil will be used are unknown, it is probable that the increasing demands for electrical and other forms of energy may result in greater requirements for fuel oils.

A new development in Ontario's oil supply are the recent increases in prices of oil and products imported from Venezuela, the Middle East and other members of the Organization of Petroleum Exporting Countries (O.P.E.C.). Ontario imported a small volume of Venezuelan crude in 1970. Some refined products were imported directly but the major volumes are transferred from

other provinces mainly Quebec, whose main sources of supply are O.P.E.C. countries, both for crude and finished products. In addition, tanker charges on these imports increased but may ease during 1971. Wellhead prices of oil in U.S.A. have advanced and a similar trend is under way in Western Canada. Consequently, price increases in some refined products have occurred and more can be expected as higher costs and prices prevail in the international crude oil market.

Table 2Ontario Oil Balance 1970 (1)

<u>Supply</u>		Quantities in Thousands of <u>Barrels</u>	<u>Percent</u>	
			<u>of Total</u>	<u>Change over 1969</u>
Crude Oil	- Ontario Production	1,048	0.6	- 9.8
	- From Western Provinces	134,137	72.0	8.6
	- Imports from Venezuela	458	0.2	8.7
	- Net Transfers and other Materials	48	-	-
	- Total Run to Stills	135,691	72.8	8.5
Products	- Transfers from Other Provinces	40,653	21.8	8.4
	- Imports	7,409	4.0	- 14.1
	- Other Receipts	2,546	1.4	- 18.4
	- Total Product Receipts	50,608	27.2	4.8
Total Supply		186,299	100.0	7.4
<u>Disposition</u>				
Consumption	- Customer Sales	167,612	90.0	8.5
	- Company Use	8,995	4.8	9.0
	- Total Consumption	176,607	94.8	8.5
Other	- Transfers to Other Provinces	4,149	2.2	- 17.8
	- Exports	2,363	1.3	-
	- Product Inventory Changes	1,836	1.0	- 6.1
	- Losses	1,344	0.7	0.8
	- Total Other Disposition	9,692	5.2	- 9.4
Total Disposition		186,299	100.0	7.4

(1) Based on data from DBS Monthly Report No. 45-004

(2) Crude Oil, condensate and pentanes plus, comingled propane and butane mixes.

Table 3

Canadian Oil Requirements in Percent of Total for 1970

	<u>Ontario</u>	<u>Prairies & N.W.T.</u>	<u>Quebec & Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	25.3	14.8	-	8.2	48.3
Imported	-	-	40.0	-	40.0
Total	25.3	14.8	40.0	8.2	88.3
Net Product Imports	1.1	-	10.0	0.6	11.7
Provincial Transfers (1)	6.0	- 1.4	- 5.2	0.6	-
Total Consumption	32.4	13.4	44.8	9.4	100.0

(1) Product Transfers between provinces plus other materials to stills plus inventory changes.

Table 4

Sources of Three Significant and All Petroleum Products 1970
Expressed as Percent of Consumption and Changes Over 1969

	<u>Motor Gasoline</u>		<u>Light Fuel Oil</u>		<u>Heavy Fuel Oil</u>		<u>All Products</u>	
	Percent Consump- tion	Change over 1969	Percent Consump- tion	Change over 1969	Percent Consump- tion	Change over 1969	Percent Consump- tion	Change over 1969
Refinery production	85.3	7.1	63.7	12.5	61.3	12.0	76.2	8.4
Transfers:								
Interprovincial - IN	14.5	3.9	24.3	0.6	30.9	53.8	22.8	8.4
OUT	1.4	-31.5	1.7	-18.8	1.2	2.5	2.3	-17.8
NET	13.1	9.8	22.6	- 2.4	29.7	57.1	20.5	12.6
Interproduct	2.1	-56.7	14.6	23.1	3.4	-29.5	-	-
Interfirm	0.8	-	2.8	-	-	-	1.4	-
Inventory (net)	- 1.1	-	- 2.1	-	- 1.2	-	- 1.0	-
Imports:	-	-	2.3	-47.6	7.2	-10.3	4.1	-14.1
Less Exports	0.2	- 0.1	3.6	0.2	0.5	- 2.9	1.3	0.3
Net Imports	- 0.2	- 0.1	- 1.6	-	6.7	-10.8	2.8	-19.4

Table 5

Ontario Net Sales of Petroleum Products 1970 (1)

	<u>Quantities in Thousand Barrels</u>	<u>Percent of Total</u>
Propane (2)	1,566	1.0
Butane & Butane Mixes	- 16	-
Petro-chemical Feed Stock	7,939	4.7
Naptha Specialties	1,387	0.8
Aviation Gasoline	273	0.2
Motor Gasoline	60,265	36.0
Aviation Turbo Fuel	4,591	2.7
Kerosene, Stove Oil, Tractor Fuel	3,569	2.1
Diesel Fuel Oil	10,727	6.4
Light Fuel Oil (Nos. 2 & 3)	39,885	23.8
Heavy Fuel Oil (Nos. 4, 5 & 6)	29,854	17.8
Asphalt	4,419	2.6
Coke	810	0.5
Lubricating Oil & Grease	2,018	1.2
Other Products	325	0.2
	<hr/>	<hr/>
Total All Products	167,612	100.0
	<hr/>	<hr/>

(1) Based on data from DBS Monthly Report No. 45-004

(2) Represents Ontario refinery production from crude oil only.

Table 6

ONTARIO REFINING CAPACITY

Primary Distillation Capacity at Year End
in Thousands of Barrels per Calendar Day.

		<u>1970</u>
Shell:	Oakville	40.0
	Corunna	50.0
Gulf:	Clarkson	55.4
B.P.:	Trafalgar	34.3
Imperial:	Sarnia	126.8
Texaco:	Port Credit	37.0
Sun Oil:	Sarnia	33.0
		<hr/>
Total Ontario	- B/CD	376.5
	- as percent of Total Canada	28.3
(Total Quebec	- as percent of Total Canada	33.9)

Natural Gas in Ontario

Natural gas consumed in Ontario increased nearly 15 percent compared with the 1969-68 advance of 12 percent. Total receipts from Western Canada were more than 30 percent higher which indicates some levelling off when compared with 38 percent in 1969, the first year after the new pipeline was completed.

The increasing availability of gas from Western Canada was accompanied by a decrease of nearly 70 percent in imports from the U.S.A. reducing their share of total supply to 2 percent from nearly 9 in 1969. While Western gas provided almost 95 percent of total supply, exports through the province mainly Niagara Falls were double that of 1969, and lowered the rate of increase in supply for the province to around 28 percent. Gas used mainly in transmission operations increased 5 percent and accounted for a similar proportion of gas moved from Western Canada.

Gas storage operations reflected significant changes over the preceding year mainly due to the increased supplies. Injections into storage especially during the summer months were 45 percent higher, compared with a 1969-68 advance of 12 percent, and could have been higher except for the need to divert some supplies directly from transmissions to distribution lines around the fall and winter consuming periods to meet increased demands. Withdrawals from storage increased 9 percent down from 12 percent in 1969. Production of gas from Ontario wells increased nearly 50 percent,

compared with the 1969-68 drop of nearly 7 percent, and provided over 3 percent of total requirements which compares with the preceding year.

Natural gas sales to consumers in the province increased more than 15 percent compared with 14 in 1969, while increasing their proportion of total sales to consumers in Canada to nearly 45 percent compared with over 40. Industrial users accounted for around one percent of total consumers but 55 percent of total sales, representing 20 percent higher consumption and 10 percent more users. Commercial sales advanced nearly 13 percent down from 24 in 1969, while consumers increased over 9 percent compared with 5 percent. Residential consumers and sales increased almost 5 percent, representing little variation from 1969-68 changes. Combined residential and commercial consumption increased over 8 percent compared to about 13 in 1969, and accounted for around 45 percent of total sales down from nearly 48.

The increasing air pollution measures will result in a substantial increase with relatively clean-burning natural gas being used for thermal generation of electricity commencing in 1971. During 1970, relatively minor quantities were so used as in the past few years. Work was commenced in converting four units of the coal-burning Hearn generating plant to use natural gas, and the necessary pipeline construction to bring supplies from the Trans-Canada main line station at Maple north of Toronto. All four units are expected to be converted by the end of 1971 and in the first full year of operation would consume in total around 50 billion

cubic feet of gas. Similar plans are understood to be under consideration for some other thermal stations now burning coal.

A new locality being served with natural gas commencing from December is the Rainy River area. The necessary pipeline construction was completed to bring supplies from the Trans-Canada line in Southeastern Manitoba through northeastern Minnesota to Fort Frances.

Table 7Ontario Natural Gas Balance 1970

	Thousands Cubic Feet*	Percent of Change Total over 1969	
<u>Supply</u>			
Ontario production	16,649,459	3.4	48.1
Receipts from:			
Western Canada	463,791,151	94.4	32.5
U.S.A.	<u>10,751,231</u>	2.2	-69.1
	474,542,382		
Propane Air	<u>18,211</u>		
<hr/>			
Total Supply	491,210,052	100.0	23.6
<hr/>			
<u>Disposition</u>			
Sales to consumers	405,513,215	82.6	15.3
Free Gas	794,909	0.1	17.7 times
Company Use	<u>25,152,807</u>	5.1	5.1
	<u>25,947,716</u>		
Total Consumption	431,460,931	87.8	14.8
Gas to Storage (Net)	19,559,389	4.0	-
Gas to Province Of Quebec (Net)	1,316,970	0.3	-33.5
Exports to U.S.A.	33,637,598	6.8	2.0 times
Metering, Line Loss & other Unaccounted for	<u>5,235,164</u>	1.1	59.3
	<u>59,749,121</u>		
<hr/>			
Total Disposition	491,210,052	100.0	23.6
<hr/>			
At 14.73 psia			

Table 8

Natural Gas Sales in Ontario 1970
Comparative Totals by Consumers Categories

<u>Category of Customer</u>	<u>Percent Changes 1970</u>					
	<u>over 1969</u>		<u>over 1965</u>			
	<u>Number of Customers</u>	<u>Quantities</u>	<u>Number of Customers</u>	<u>Quantities</u>	<u>Number of Customers</u>	<u>Quantities</u>
Residential	747,481	101,308,168	4.7	4.7	18.2	29.3
Commercial	72,001	80,900,122	9.5	12.9	37.1	2.2 times
Industrial	8,950	223,304,925	10.9	21.8	33.1	2.1 times
TOTALS	828,432	405,513,215	5.2	15.3	19.8	84.9

Figure 3

NATURAL GAS SALES BY YEAR AND CATEGORY

Millions
of Mcf.

450

400

350

300

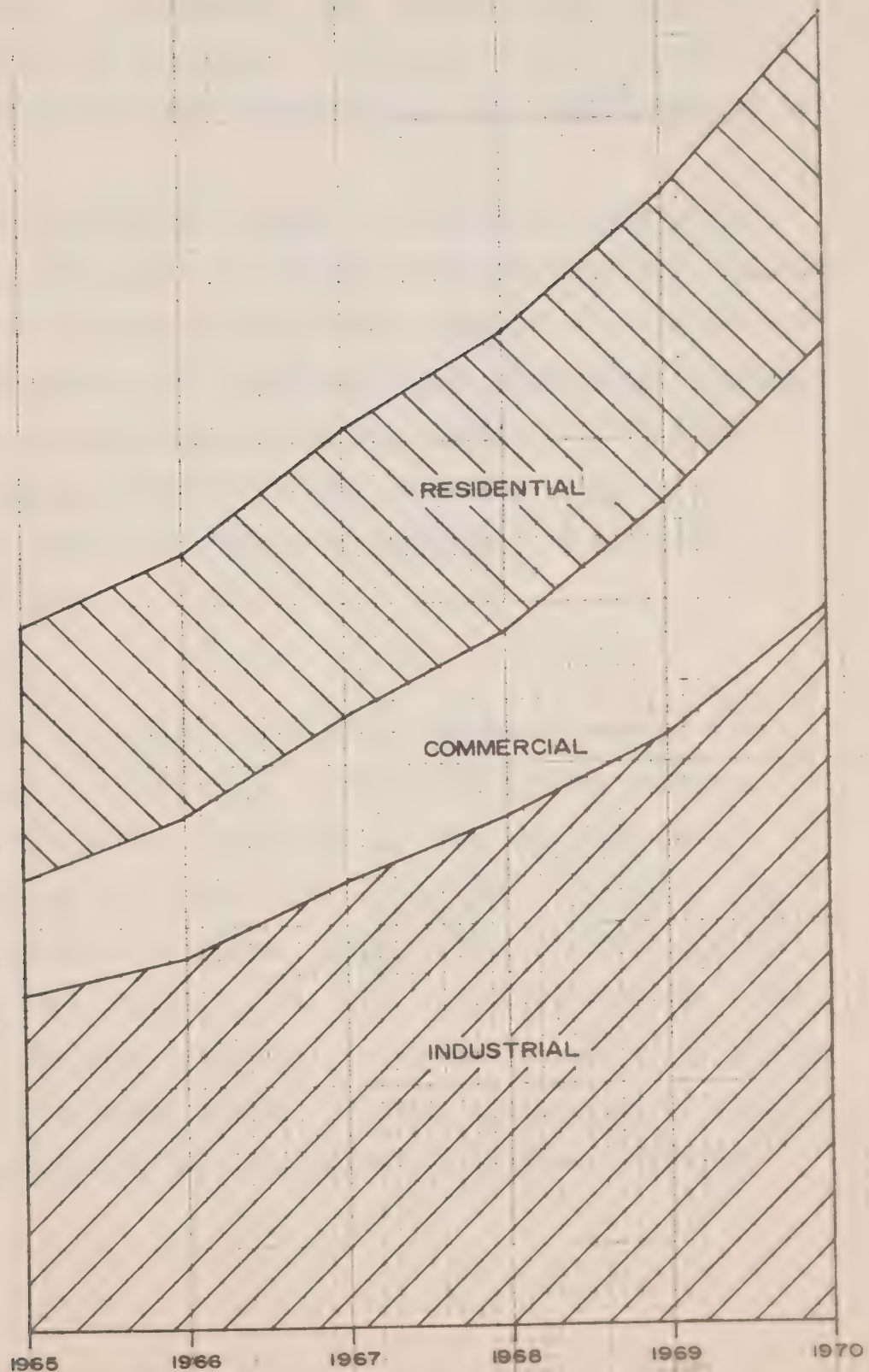
250

200

150

100

50



Propane In Ontario

Introduction

Propane statistics appearing initially in this issue of Energy in Ontario are the results of extensive efforts by the Dominion Bureau of Statistics, with industry assistance and co-operation by the provinces, to produce data on refinery production, receipts from Western Canada and consumption of propane.

Propane produced from crude oil comprise a relatively small but important part of refined petroleum products, and also appears in the section of this report entitled "Oil in Ontario" which must be taken into consideration in using these propane statistics. Propane from natural gas comprises the major portion of interprovincial receipts and much of sales to distributors, while the remaining statistics relate mainly to crude oil propane.

Propane Supply

Receipts of propane from Western Canada increased more than 3 percent compared with a 1969/68 advance of nearly 9 percent. A 45 percent advance by mid-year was reduced by decreases during the second half of the year. Supplies from natural gas processing plants changed little by the year-end over 1969 and accounted for the bulk of these decreases. The comparable 1969/68 data showed an increase of nearly 12 percent in receipts from these plants. Natural gas propane accounted for nearly 48 percent of total supplies compared with over

50 in 1969, while that from crude oil supplied over 2 percent of the total compared with minor 1969 volumes from Western Canada.

Production of propane in Ontario refineries decreased nearly 8 percent and provided over 45 percent of total supply, compared with a 1969/68 advance of 14 percent and nearly 55 percent of total supply.

Sales and Other Disposition

Propane sales to distributors increased over 10 percent by the year-end, compared to 40 by mid-year, and accounted for over 80 percent of total disposition which compares with 1969. Natural gas propane sales changed little while accounting for nearly 60 percent of these sales compared to 64 in 1969. The lower rate of sales after June-end followed the similar trend of decreased receipts.

Crude oil propane used in petro-chemical and industrial applications decreased over 20 percent, compared to a similar decline at mid-year, while accounting for over 20 percent of total disposition. Comparable 1969/68 data showed a 2 percent increase and nearly 30 percent of total disposition. Sales of crude-base propane to distributors increased nearly 30 percent and provided over 40 percent of these sales, compared to the 1969/68 advance of 9 percent and over 35 percent of total sales.

Table 9
Propane Receipts and Disposition in Ontario

1970

In Barrels

		<u>Percent</u>	
	Volumes	Total	Change 1970/69
<u>SUPPLY</u>			
Refinery production	2,106,882	46.1	- 7.9
Interprovincial transfer	2,286,623	50.0	3.5
IN	<u>16,319</u>		
OUT			
Net transfer	2,270,304	49.7	3.1
Inventory changes	<u>207,701</u>	<u>4.5</u>	-
Net Canadian Supply	4,584,887	100.3	7.9
Imports	1,590		- 38.4
Less Exports	<u>14,574</u>		100.0
Net Imports	<u>- 12,984</u>	<u>- 0.3</u>	
TOTAL SUPPLY	4,571,903	100.0	7.5
<u>DISPOSITION</u>			
Petro-chemical and Industrial	939,321	20.5	- 23.0
Distributors	<u>3,756,586</u>	<u>82.2</u>	<u>10.3</u>
Sub-total	4,695,907	102.7	1.6
Plant and refinery use	92,036	2.0	
Losses or gains	983		
Adjustments	<u>- 217,023</u>	<u>- 4.7</u>	
TOTAL DISPOSITION	4,571,903	100.0	7.5

Note 1. Identifiable industrial sales are included. Distributor sales may contain sales to industrial.

Pipelines in Ontario

Large integrated pipeline systems facilitate the transmission of western Canadian oil and gas to the refineries and markets in Ontario. During 1970, pipeline systems in Ontario continued to expand in response to increasing demand from existing market growth and from new market development.

Natural gas pipelines in Ontario represented over one third of Canada's total natural gas pipeline mileage. Comparable advances in both the northern and southern Ontario sectors resulted in a 3 percent increase in natural gas transmission and distribution lines. The largest community to be served with natural gas under 1970 authorizations was the Town of Fort Frances. Although there was no addition in Ontario to Trans Canada Pipe Line's system in 1970, the natural gas utilities added 104 miles of transmission line, 55 miles of which was accounted for by Inter-City Gas Limited between Rainy River and Fort Frances.

A 7 percent increase in crude oil trunk line mileage plus additional pumping power increased the capacity of crude oil deliveries to refineries in Ontario. Also, a new natural gas liquids stream was initiated during the year from western Canada to Sarnia. The stream, containing a mixture of propane, butane and condensate, is transmitted in batches in the crude oil lines of the Interprovincial Pipe Line Company.



Table 10

Pipeline Mileage in Ontario - 1970

	<u>Miles</u>	<u>Percent Increases 1970/1969</u>
<u>Natural Gas Pipelines</u>		
Gathering	1,221	2.3
Transmission	3,616	3.0
Distribution	15,493	3.1
	<hr/>	<hr/>
Total	20,330	3.0
 <u>Oil Pipelines</u>		
Crude Oil Truck Lines	316	7.1
Oil Product Lines	870	0
	<hr/>	<hr/>
Total	1,186	1.7
 Total All Pipelines	<hr/> 21,516	<hr/> 3.0

Coal in Ontario

The position of coal in Ontario's energy supplies during 1970 changed notably over the preceding year. Compared with 1969-68 decreases, imports from the U.S.A. and receipts from Western Canada increased, mainly due to the greater use of coal for thermal generation of electricity. Ontario accounted for over 90 percent of coal imported from the U.S.A. into Canada and around 45 percent of total receipts in Canada.

Total demand for coal (less net inventory additions) increased over 11 percent compared with the 1969-68 decrease of 5 percent. Bituminous coal imports advanced over 15 percent, compared with a slight 1969-68 decrease, accounting for over 95 percent of total provincial supply as in 1969. Inventories of coal on hand at the close of 1970 compared with that for the preceding year.

Lignite receipts from Saskatchewan quadrupled the 1969 volume, much of which was used for thermal generation. Bituminous coal from Western Canada increased considerably because of shipments totalling over 160,000 tons for experimental use in steel-making in the Hamilton area. Receipts of Nova Scotia bituminous decreased over 50 percent, continuing the declining trend in this source from prior years. Anthracite requirements were unchanged over their relatively minor 1969 volume.

The use of lignite mined in Northern Ontario for thermal generation has been under study. While its sulphur content is low, nearly 50 percent of this lignite is water and its



BTU potential per ton is around 5,000 compared with 13,000 from bituminous coal. Lignite from Western Canada contains somewhat less water and produces around 40 percent more BTU's per ton than that from Northern Ontario.

Industrial consumption increased over 6 percent compared with a 1969-68 advance of 2 percent. In the Central Ontario Region, consumption decreased around 10 percent compared with a 1969-68 increase of 5 percent, while accounting for over 60 percent of the total. However, an advance of over 70 percent occurred in the Southern Ontario Region of Lakes Erie and St. Clair, compared with a 1969-68 increase of 12 percent, and provided over 30 percent of total. The net increase in industrial consumption in these two major coal use regions was over 7 percent which compares with the preceding year.

Coal continued to be the major fuel for thermal generation of electricity during 1970, with over 8 million tons so consumed being over 25 percent higher than in 1969. Of total electricity used in the province, around 35 percent was provided by thermal generation which compares with 32 percent in 1969. However, the use of coal for this purpose is expected to change for many reasons. The price of imported coal at points of exit from the U.S.A. increased 75 percent during the last half of the year, and further increases are indicated because of advancing labour costs and other reasons. A major factor affecting coal use is the accentuated anti-pollution measures which have resulted in a trend towards using natural gas in some plants and in the longer term towards low-sulphur fuel oil.

While nuclear-powered plants have supplied a minor portion of electricity demand, new plants under construction also may displace coal to some degree as completed units begin producing power in the near future.

The new major coal fields in Alberta and British Columbia have been experiencing development problems, resulting in increased costs of operation. With the major portion of their output committed for export to Japan, there is little likelihood of any further sales to Eastern Canada for some time. However, studies are continuing on economic methods of transportation to penetrate the Eastern Canadian and other markets, such as the unit train used to bring coal to Hamilton, and development of solids pipelines and moving coal in slurry form.

Table 11

ONTARIO COAL BALANCE 1970

(In thousands of short tons, rounded to the nearest 1000)

				1970	
				<u>Total</u>	<u>% Change from 1969</u>
<u>Supply</u>					
Domestic: Western Provinces	--	206	539	745	4.4 times
Nova Scotia	--	165	--	165	-54.8
Total	--	371	539	910	70.7
Imports: U.S.A.	150	18,124	--	18,274	15.4
Total Coal Supply	150	18,495	539	19,184	17.2
<hr/>					
<u>Demand</u>					
Industrial: Consumption (2)	57	10,407	290	10,754	6.6
Net to Inventory (3)	(5)	736	220	951	--
Total Demand	52	11,143	510	11,705	16.0
Other (4): Total Demand	98	7,352	29	7,479	19.1
Total Coal Demand	150	18,495	539	19,184	17.2

(1) Includes sub-bituminous in negligible quantities.

(2) Industrial includes electric utilities, mining and manufacturing.

(3) Excludes stocks held by firms using less than 1000 tons per year and stocks held by coke producers.

(4) Retail to residential, commercial and small industrial users including railway, ship bunker, government and institutional consumption.

Source: DBS Catalogue No. 45-002

Ontario Industrial Coal Consumption by Economic Regions

(In thousands of short tons, rounded to nearest 500)

1970

	Anthracite	(1) Bituminous	Lignite	1970	
				Total	% Change from 1969
<u>Economic Regions</u>					
Eastern Ontario	-	43	-	43	-42.4
Lake Ontario	-	179	-	179	- 3.2
Central Ontario - Metropolitan, Niagara, Upper Grand R., Georgian Bay	57	6,118	-	6,175	-10.1
Southern Ontario - Lake Erie, Lake St. Clair	-	3,202	115	3,317	70.3
Northeastern Ontario	-	646	-	646	3.2
Northwestern Ontario	-	219	175	394	2.0
Total Ontario 1970	57	10,407	290	10,754	6.6

(1) Includes sub-bituminous coal in negligible quantities.

Source: DBS Catalogue No. 45-002

Electricity in Ontario

Consumption of electricity in the province during 1970 totalled over 69 billion kilowatt-hours for an increase of more than 7 percent compared with the 1969-68 advance of nearly 6 percent. End-use consumption showed changes over the preceding year, with more than 55 percent of the total provided by hydro-electricity and over 35 percent by thermal-electricity compared with over 60 and 30 percent respectively in 1969. The remainder of supplies were received from other provinces and the U.S.A. Nuclear generation, while comparatively small, provided over 940 million kwh for a 90 percent advance compared with a 1969-68 decrease of over 40 percent and accounted for over one percent of total electricity made available.

The dominant position of electricity generated from water power eased over 1969 as increasing supplies were provided by thermal generation mainly from coal-fired plants. Thermal generation increased 20 percent, compared with a 1969-68 advance of 14 percent, while hydro-electricity supplies decreased over 2 percent.

Ontario Hydro brought 1.4 million kw of new capacity on line in 1970 mainly due to a further two 500,000 kw units of the 2,000,000 kw Lambton coal-firing station, and two hydro-electric units at Wells Generating station on the Mississauga River. Much of the construction work was completed on the 4,000,000 kw Nanticoke coal-fired station of which the first unit is expected to produce power by the end of 1971.

Engineering work and site preparation were under way on the first oil-fired Lennox 2,295,000 kw station near Kingston. Further hydro plant additions were the two unit 228,000 kw Lower Notch station on the Montreal River to be in service in late 1971, eight new transformer stations placed in service and a further eight under way by the year-end.

A significant new development in thermal generation to meet air pollution standards was the extensive work started to convert the Hearn coal-burning station to use natural gas. Four units are being converted exclusively to burn gas and the remaining four to a combination of coal or gas. The first units are expected to be fuelled by gas around mid-year and all units by the end of 1971.

The Ontario nuclear power programme showed some interesting changes over 1969. The Douglas Point Station produced nearly 850 million kwh during the year. Despite some equipment and heavy water problems, success in on-power fuelling contributed materially to maintaining capability during most of 1970, compared with the extensive shut-downs of the preceding year. The first of the four units of the 2,160,000 kw Pickering station was almost complete by the year-end and ready for start-up early in 1971 with first output of power expected shortly thereafter. The second 540,000 kw unit is planned for start-up and production of power near the end of 1971, and the remaining two units are to follow in 1972-73. Preliminary excavation and other site work of the 3,000,000 kw Bruce nuclear generating station near

Douglas Point, Ontario's largest, was completed by the year-end and its four 750,000 kw units are expected to come into service between 1976 and 1979.

A shortage in supplies of heavy water essential to the province's nuclear power plant system developed from the continued failure of the heavy water plant at Glace Bay, Nova Scotia, to get into production and federal government assistance is being studied. While the Canadian General Electric plant at Port Hawkesbury N.S. produced some heavy water by the fall of 1970, the extent of Canada's short term needs particularly for Ontario necessitated that supplies be purchased from Sweden and Russia, in addition to the U.S.A. Construction of the Bruce 800 ton-per-year heavy water plant and auxiliary steam plant progressed during the year from which initial output is expected by 1972. Pending significant output from all these plants, continued imports of heavy water will be necessary for the foreseeable near future. An interesting development at the Bruce plant is the provision made for sizeable supplies of heavy fuel oil to commence in late 1971 for its auxiliary steam plant.

Table 13
Electric Energy Balance 1970

		<u>Ontario (1)</u>		<u>HEPCO (2)</u>
		Billions (10 ⁹)kwh	% Change over 1969	Billions (10 ⁹)kwh
<u>Supply</u>				
Utilities Generation	- Hydro	37.5	(-2.3)	35.7
	- Thermal	23.4	(21.2)	23.4
	- Total	60.9	(5.5)	59.1
Industry Generation	- Hydro	1.6	(15.9)	
	- Thermal	1.3	(0)	
	- Total	2.9	(-3.3)	
Total Generation	- Hydro	39.1	(-2.5)	35.7
	- Thermal	24.7	(19.9)	23.4
	- Total	63.8	(5.1)	59.1
Net Purchases ³		5.6	(43.6)	5.8(3)
Total Supply		69.4	(7.4)	64.9
<u>Disposition</u>				
Sales	- Industrial	25.8	(1.6)	
	- Commercial	8.0	(3.9)	
	- Domestic & Farm	14.4	(2.1)	
	- Street Lighting	0.4	(0)	
	- Total Sales	48.6	(2.1)	
	Own Plant Use	7.1	(6.0)	
Unallocated and Distribution by Non-respondents		13.7	(33.0)	
Total Disposition		69.4	(7.4)	

- (1) DBS 57-001
 (2) Hydro-Electric Power Commission of Ontario
 (3) Other Provinces and USA only; excludes transfers within Ontario and purchases from AECL Douglas Point Nuclear Generating Station which is included in "Thermal".



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Table of Contents

	<u>Page No.</u>
Highlights	1
Primary Energy Consumption in Ontario	2
Percent Breakdown	4
By Source in BTU 1971	5
Annual Percent Increases	6
By Source in BTU 1967-1971	7
Oil in Ontario	8
Oil Balance Sheet	16
Canadian Oil Requirements	17
Sources of Refined Products	18
Sales of Products	19
Oil Refineries	20
Natural Gas in Ontario	21
Gas Balance Sheet	26
Sales 1971	27
Sales 1966-1971	28
Propane in Ontario	29
Propane Receipts and Disposition	30
Pipelines in Ontario	31
Pipeline Mileage	33
Coal in Ontario	34
Coal Balance Sheet	37
Electricity in Ontario	38
Electric Energy Balance	42

ONTARIO ENERGY HIGHLIGHTS 1971

Total energy consumption in Ontario increased in 1971 but at a lower rate than in 1970. Rates of 1971 gains for nearly all energy sources were off while a loss was experienced by coal. Natural gas and thermally-generated electricity showed important advances realized at the expense of oil, hydro-electricity and some coal. While oil's increase was much lower than in 1970, it retained a dominant position over other fuels mainly in the transportation and heating fuel markets.

Crude oil from Western Canada and Ontario refinery output eased to minor advances compared to larger increases in 1970. Production from Ontario oil fields decreased and provided a minor portion of total supply. Imported oil also declined and supplied a small part of the total. The new oil unit trains began initial deliveries in the province late in the year.

Natural gas receipts from Western Canada advanced over 1970 but at a sharply lower rate. Imports from the U.S.A. increased while exports declined. Withdrawals from gas storage pools were higher and injections less, while output from Ontario gas wells decreased but continued to provide around 3 percent of total supply.

Costs of imported oil increased followed by higher selling prices of gasoline, fuel oils and other oil products. Imported coal also cost more. These increases followed a general trend of higher prices for nearly all types of energy.

The outstanding success of the Pickering nuclear plant was an important milestone in thermal generation of electricity, and was accompanied by more natural gas and less coal being used at the Hearn plant.

PRIMARY ENERGY CONSUMPTION IN ONTARIO 1971

The use of supplies of primary energy in Ontario, nearly 90 percent of which originate from sources outside the province, reflected significant changes over 1970. Continuing a trend of the past few years, changes involved not only increased consumption but also a shifting pattern of the significant types of energy sources used. The extent of primary energy consumed in Ontario on a comparative heat-equivalent basis during 1971 appears in the accompanying table and charts.

Total primary consumption in the province exceeded $2,214 \times 10^{12}$ BTU for an increase of over 3 percent which indicated a decline from the 1970/69 advance of over 9 percent. This lower rate of growth accompanied eased demands in some sectors of the industrial market.

The proportion of total energy contributed by natural gas showed the largest rate of increase although off slightly from 1970. Natural gas used in the Hearn electrical generating station mainly from the third quarter replaced substantial coal volumes and provided about one percent of total electricity by the year end. Oil kept its position as the most significant energy source but had a lower rate of increase compared with its 1970 advance of 7 percent.

Coal declined from its dominance in fuels used for thermal generation of electricity, decreasing two percent off from an 11 percent advance in 1970, mainly because of initial significant

inroads by natural gas and nuclear energy. In addition to natural gas, nuclear generation, mainly from the new Pickering plant, surpassed prior years in quadrupling its 1970 output and providing nearly two percent of total energy. Consumption of electricity increased 5 percent in terms of kilowatt-hours while the input of primary energy to develop this output was up nearly 9 percent due to a 20 percent advance in thermal generation. Decreases of nearly 3 percent in hydro-electricity and around 20 percent in net interprovincial transfers and imports reduced these to a combined share of total energy consumption of nearly 9 percent compared to almost 10 percent in 1970.

The lower rate of increase in total energy consumption for 1971 is difficult to explain, but it may be attributed in part to increasing substitution of natural gas for less efficient oil and coal.

Heat-equivalent Conversion Factors for

Primary Energy Sources *

Oil	5.8×10^6	BTU/ barrel
Natural Gas	1,035	BTU/ Mcf
Coal	24.2×10^6	BTU/ short ton
Electricity:		
Hydro	4,000	BTU/ kilowatt hour
Nuclear, thermal & purchased	10,000	BTU/ kilowatt hour

* Applied to reviews for 1971 and previous years.

Figure 1

Primary Energy Consumption By Source
As Percent Of Total Consumption For 1971

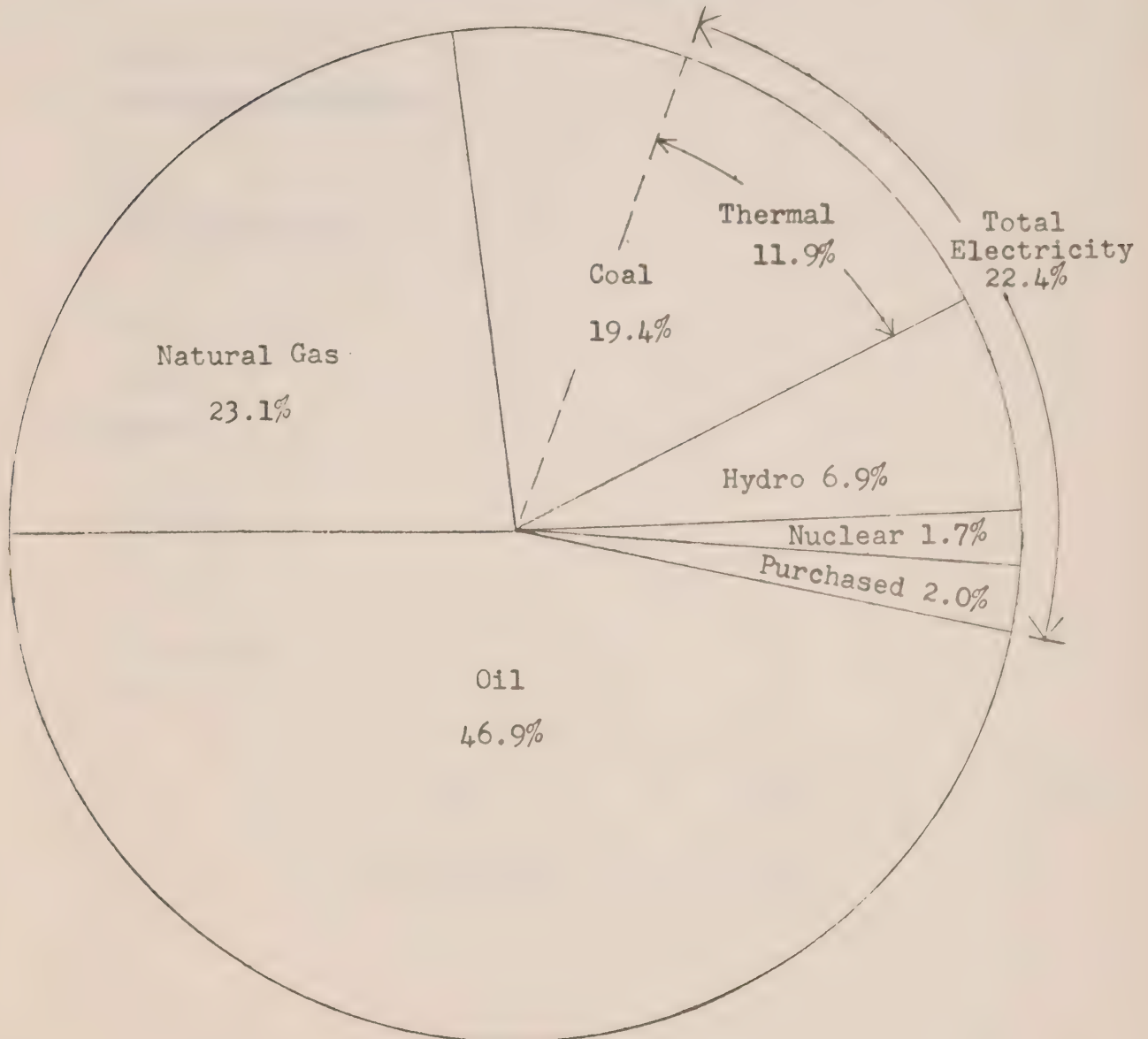


Figure 2

Primary Energy Consumption in Ontario - 1971

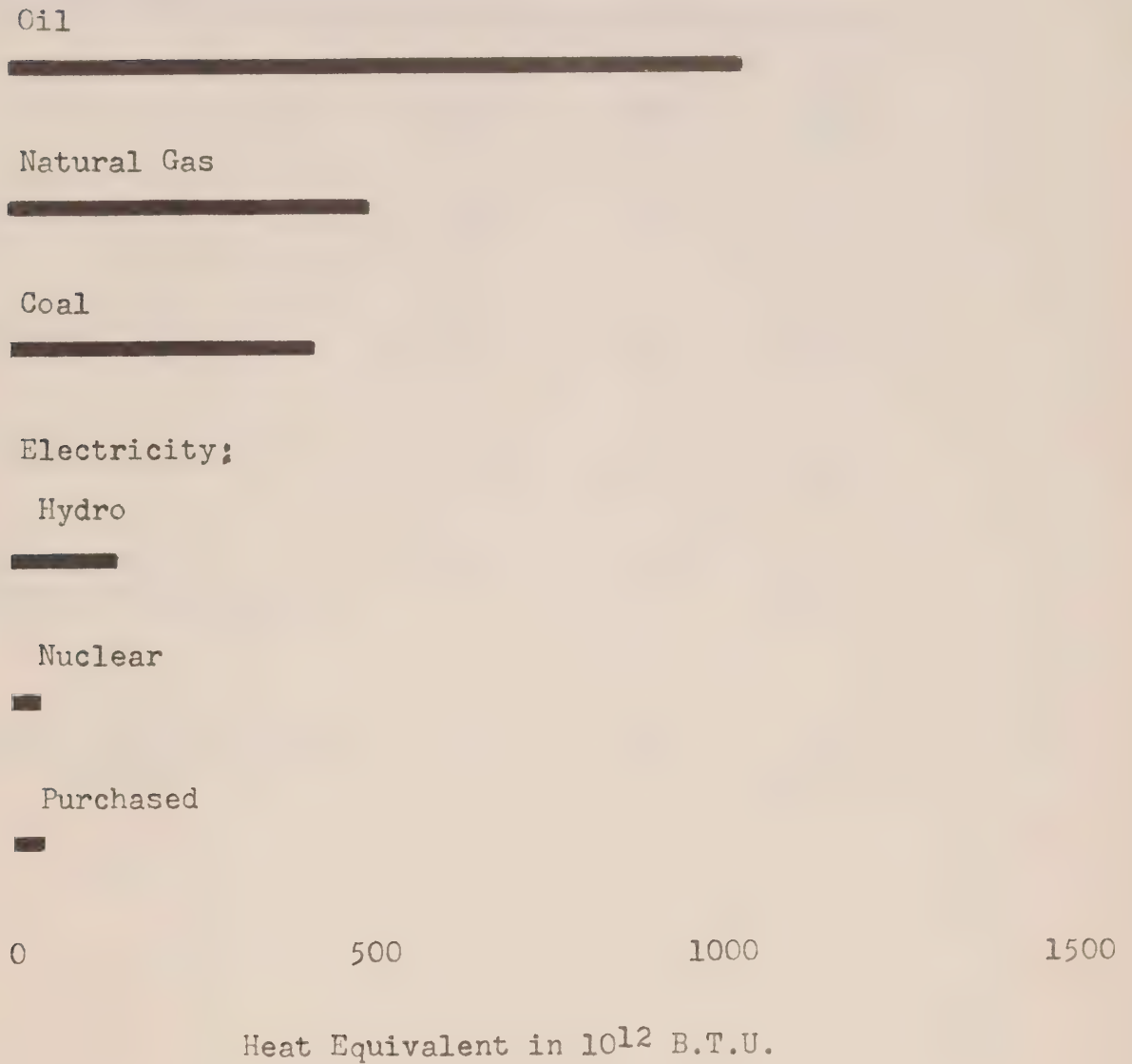
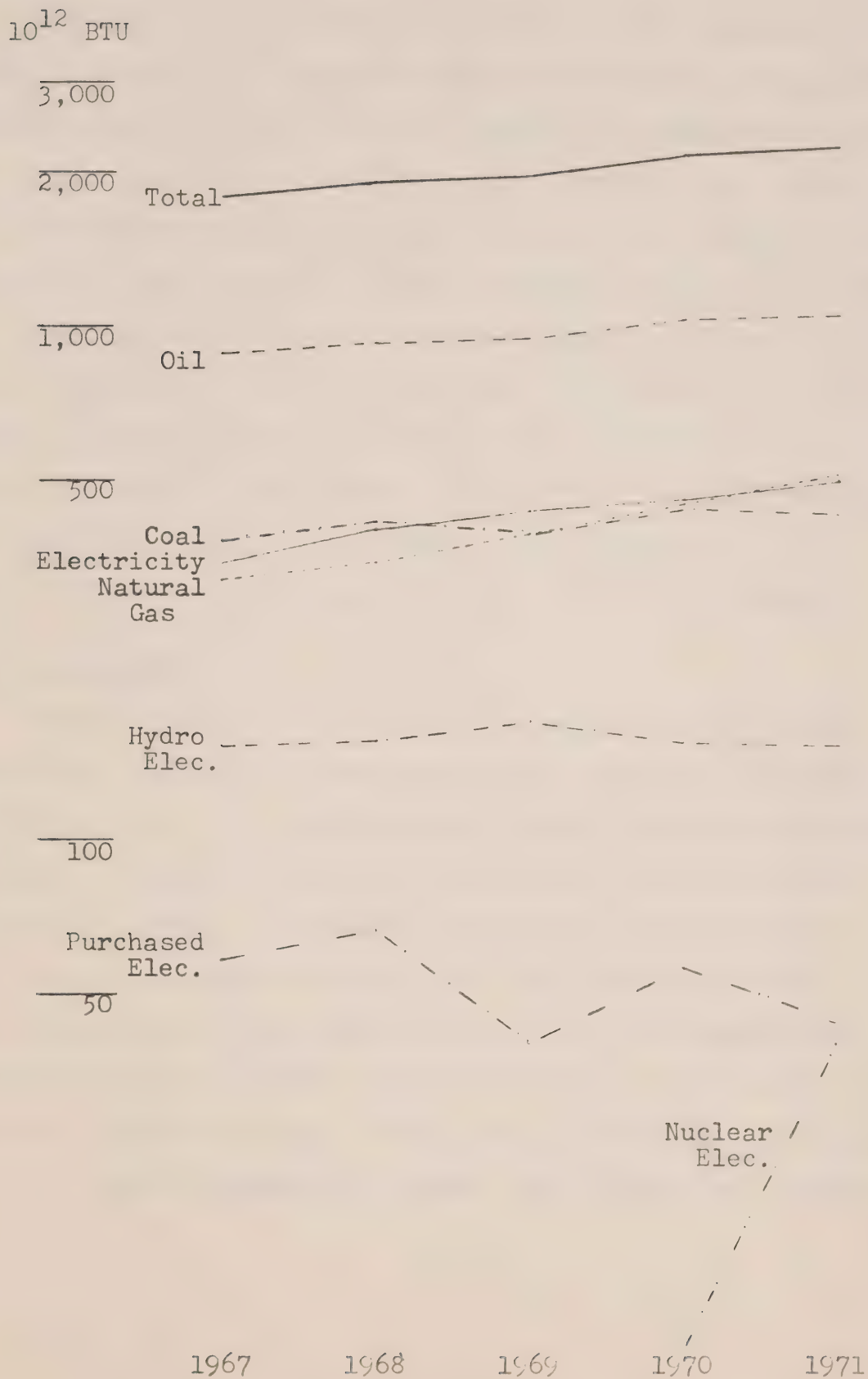


Table 1

Ontario Energy Consumption Annual Percent Increases

	<u>1971</u>	<u>1970</u>	<u>1969</u>
Oil	1.1	7.3	2.7
Natural Gas	12.3	14.9	12.5
Coal	-2.8	11.4	-3.6
Electricity (primary & secondary)	8.8	11.2	10.1
TOTAL Primary Energy	3.6	9.6	3.0

PRIMARY ENERGY CONSUMPTION IN ONTARIO 1967-1971HEAT EQUIVALENT IN B.T.U.

OIL IN ONTARIO

General

Oil maintained its dominant position as the supplier of nearly 50 percent of Ontario's energy requirements during 1971, although growth rates of both its supply and consumption eased from higher increases in 1970 over the previous year. Crude oil from Western Canada and output of refineries showed small advances by the year-end. Refined products received from other provinces and those imported decreased along with lower crude imports and native Ontario production. Increases in selling prices of gasoline and other Quebec-refined products sold in Eastern Ontario followed higher prices of oil imported mainly from Venezuela and the Middle East, while advances in some product prices in other areas of the province also occurred.

Crude Oil Supply

Crude oil receipts from Western Canada increased around one percent by the end of December, after advancing 5 percent by mid-year over 1970, compared with a 1970 increase of nearly 9 percent. Supplies from Alberta increased around 10 percent, off from 20 percent at mid-year and a similar 1970 advance, while providing nearly 70 percent of total crude supplies, compared with over 60 percent in 1970. Oil from Saskatchewan decreased nearly 20 percent, further off from a 1970 decline of 7 percent, with 28 percent of the total, and Manitoba provided almost a further 3 percent of supply with a 4 percent increase.

Ontario's oil production declined almost 9 percent accounting for less than one percent of total supply. Crude imports from Venezuela decreased over 10 percent and also provided under one percent of total requirements.

Refined Petroleum Products

Production of refined products in Ontario's oil refineries increased nearly two percent by the close of 1971, compared with a 5 percent mid-year advance, off from a 1970 increase of 8 percent. Ontario accounted for around 27 percent of total Canadian refinery production, down from nearly 30 percent in 1970, and its two percent output increase over 1970 was off sharply from Canada's 9 percent advance. Despite an increase of around two percent in refining capacity as in 1970, output approached the maximum range of refinery capabilities, reflecting the need for additional capacity to handle the anticipated higher future demand for oil products in the province.

Selling prices of some products refined in Ontario from Western Canada crude increased up to two cents per gallon around mid-year to meet higher costs experienced by distributors and other sectors of the oil industry. A one cent fuel oil price increase in January followed a 1970 advance of 25 cents per barrel on Western Canada crude. By the year end, indications were that the producing industry in Western Canada would press for even higher wellhead prices as incentives for meeting the mounting costs of exploration and development to step up proven reserves and enable a higher rate of production to be realized over that of the past couple of years.

Net product transfers mainly from Quebec complemented Ontario refinery output in providing a combined total of over 95 percent of product consumption, despite a minor decrease on the year compared with a 1970 advance of 12 percent. Rates of decrease in product transfers by the year-end were lower than those at mid-year, indicating possible firming of demand following initial effects of April increases of around three cents per gallon in selling prices of gasoline and fuel oils in Eastern Ontario. These increases stemmed mainly from the higher prices of crude oil set by the major foreign producing countries exporting to Quebec whose refineries supply products to Eastern Ontario. Also with higher prices prevailing for offshore petroleum products, net product imports dropped 50 percent compared to a 20 percent decline in the previous year. This reduced the proportion of net imports to total consumption from three to one percent.

Volume sales of all refined products increased nearly one percent, down from a 1970 advance of 8 percent, while accounting for around 32 percent of the all-Canada total as for 1970. Ontario sales were off from the all-Canada increase of over two percent which also was down from a 1970 advance of almost 7 percent. Percent changes in major product sales were motor gasoline up nearly 6, light fuel oil relatively unchanged, heavy fuel oil down nearly 7 and diesel up by almost 8 percent, with these 4 accounting for around 85 percent of total sales as for 1970. By comparison, 1970 changes were all increases with motor gasoline up around one

percent, light fuel oil 8, heavy 15 and diesel up 8 percent.

Current and Future Developments

The demand for petroleum products especially in the fuel oils sector is expected to increase with the progress in construction of industrial facilities by major potential consumers of oil. December saw the initial delivery by the first continuous unit train to move heavy fuel from Montreal refineries to produce steam for the new heavy water plant being built at the nuclear energy complex at Douglas Point. Construction on the new Lennox oil-burning thermal electric generating plant near Kingston has progressed to contracting for fuel oil supplies from Quebec also planned to be transported by unit train commencing with the expected start-up of this plant by the close of 1974. With the continuing emphasis on prevention of pollution and the lower sulphur content of oil over coal, the increasing demand for electricity may stimulate plans for converting existing generating plants now using coal or building new stations designed to use oil.

The anticipated higher level of fuel oil and other product requirements will involve a combination of building additions to refinery capacities in both Ontario and Quebec and, in the latter case, a continued dependance upon an uninterrupted supply of oil from offshore sources. Shell Oil is increasing the capacity of its Corunna refinery to about 70,000 barrels per day (bpd) in 1972. BP Oil plans a 40,000 bpd addition to its Trafalgar plant for 1974. Construction of Texaco's planned 50,000 bpd refinery at Nanticoke had not started by the year end.

Further delay could result in a larger plant (e.g. 75,000 bpd) being built eventually. Gulf Oil's new refinery to be built at Edmonton in 1973 is expected to provide for part of the Ontario oil market and, together with the building of Imperial Oil's even larger plant to commence next year in the same area, will make Edmonton Canada's second largest refinery centre after Montreal when fully developed around 1975.

Future refinery additions in Quebec are expected to include 50,000 bpd to provide for growing market requirements in the Ottawa Valley region east of the National Oil Policy Line. One major oil company has postponed completion of a substantial refinery addition because of a current surplus capability in Quebec and other parts of Eastern Canada. This surplus apparently has arisen because financial grants and other incentives being offered by the three levels of government have stimulated additional new refinery construction, despite the fact that industry already had provided adequate capacity or had indicated plans to do so at its own expense. A further related problem of concern to some members of industry is that, while government funding has caused excess refinery capacity, the National Oil Policy limits markets by discouraging unrestricted shipment of Quebec-refined gasoline into Ontario, and at the same time leaves their local markets open to the dumping of petroleum products from foreign countries.

A major problem affecting supply of fuel oils especially that for thermal generation of electricity in Ontario is the unsteady but mounting level of prices of crude oil imported from Venezuela

and the Middle East which combined are the sources of Quebec's oil supply from which fuel oils are refined for the Ontario market. These countries comprise the bulk of the membership of the Organization of Petroleum Exporting Countries (OPEC) who account for a major portion of the Free World's oil reserves and supply significant areas of the international oil consuming markets such as the U.S.A., Europe as well as Eastern Canada. In addition to at least two increases in their oil export prices during the year, the OPEC are maintaining strong pressures on major oil producers operating in their countries for additional payments and credits through oil tax increases, annual increments, participation in operations and other measures, while threatening suspension or nationalization of operations if their demands are not met.

Venezuela, the bulk of whose oil production goes to the U.S.A. and Canada, latterly supplying around 65 percent of Quebec's requirements, increased its taxes and other levies on exports to the extent where it cost one major Canadian oil company around 25 percent more per imported barrel since early in the year. Because of even greater revenue demands by Venezuela in the near future, importers are reducing their take from that country resulting in lower production there. With industry facing the mounting prices of imported oil while trying to keep the rising costs of anti-pollution measures in check, the comparably higher priced average grade Venezuela crude oil and the availability of lower sulphur crude from some Middle East countries could result

in diversion of some demand towards the latter sources.

Anticipated further increases in prices of oil from all OPEC countries will continue to be studied by industry and undoubtedly be reflected in the choice of fuels selected for future thermal generating stations.

The extensive Athabasca tar sands in Northern Alberta are to be more actively developed in the near future. By the year end, one major firm reportedly was authorized to build a new 125,000 bpd oil extraction plant while another was planning to expand its 45,000 bpd plant to around 60,000 bpd. Subject to completion of research on special operating techniques and clarification of certain taxation, royalty and other matters, it is hoped that construction contracts for the new plant will be issued by the close of 1972 to meet completion target date of 1976. With an estimated 300 billions of barrels of recoverable synthetic oil in the 30,000 square mile tar sands region, other firms are considering development of present holdings along with new firms wishing to participate which would result in construction of additional extraction plants and greater output. The firm building this new plant is understood to be hoping that eventually part of its output will enter Eastern Canadian markets provided Canada reduces oil imports into that region.

A new approach in fuelling thermal generating stations is the use of low-sulphur crude by some U.S. electric utilities to meet stringent new air-quality standards. While the more volatile crude requires special storage and other equipment, supplies of fuel oils in the U.S.A. became scarce during 1970 and their prices

rose while low-sulphur coal was difficult to obtain. Although subsequent increases in prices of imported crude reduced its cost advantage over fuel oils, utilities there reportedly were able to switch back easily to fuel oils and even coal. Electricity generated from burning crude oil provided a small part of total U.S. requirements and is not expected to increase significantly. One Midwest U.S. power company is importing Alberta low sulphur crude because of its lower cost over heavy fuel oil, but apparently only for a limited period until other fuels become available in adequate volumes and at lower prices.

Table 2

Ontario Oil Balance 1971 (1)

		Quantities in Thousands of <u>Barrels</u>	<u>Percent</u> <u>of Total</u>	<u>Change over 1970</u>
<u>Supply</u>				
Crude Oil	- Ontario Production	958	0.5	- 8.6
(2)	- From Western Provinces	134,506	72.2	0.3
	- Imports from Venezuela	408	0.2	- 11.0
	- Net Transfers and other Materials	2,302	1.2	±
	- Total Run to Stills	138,174	74.1	1.8
Products	- Transfers from Other Provinces	39,992	21.5	- 1.6
	- Imports	4,417	2.4	- 40.0
	- Other Receipts	3,842	2.0	51.0
	- Total Product Receipts	48,251	25.9	- 4.7
Total Supply		186,425	100.0	0.1
=====				
<u>Disposition</u>				
Consumption	- Customer Sales	168,865	90.6	0.7
	- Company Use	9,432	5.0	4.9
	- Total Consumption	178,297	95.6	1.0
Other	- Transfers to Other Provinces	4,026	2.2	- 3.0
	- Exports	2,087	1.1	- 12.0
	- Product Inventory Changes	1,237	0.7	- 33.0
	- Losses	778	0.4	- 42.0
	- Total Other Disposition	8,128	4.4	- 16.0
Total Disposition		186,425	100.0	0.1

(1) Based on data from DBS Monthly Report No. 45-004

(2) Crude Oil, condensate and pentanes plus, comingled propane and butane mixes.

Table 3

Canadian Oil Requirements in Percent of Total for 1971

	<u>Ontario</u>	<u>Prairies & N.W.T.</u>	<u>Quebec & Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	25.2	15.0	-	8.4	48.6
Imported	0.1	-	45.2	-	45.3
Total	25.3	15.0	45.2	8.4	93.9
Net Product Imports	0.5	0.2	6.4	0.5	7.6
Provincial Transfers (1)	6.5	- 1.3	- 7.4	0.7	- 1.5
Total Consumption	32.3	13.9	44.2	9.6	100.0

(1) Product Transfers between provinces plus other materials to stills plus inventory changes.

Table 4

Sources of Three Significant and All Petroleum Products 1971
Expressed as Percentages of Consumption and Changes over 1970

	<u>Motor Gasoline</u>		<u>Light Fuel Oil</u>		<u>Heavy Fuel Oil</u>		<u>All Products</u>	
	Percent Consump- tion	Change over 1970	Percent Consump- tion	Change over 1970	Percent Consump- tion	Change over 1970	Percent Consump- tion	Change over 1970
Refinery Production	83.4	3.6	68.1	6.9	60.9	- 6.5	77.0	1.9
Transfers:								
Interprovincial - IN	14.5	6.3	23.0	- 5.4	33.8	2.9	22.3	- 1.6
OUT	1.0	-22.9	0.7	-56.6	0.2	-85.7	2.2	- 3.0
NET	13.5	9.4	22.3	- 1.6	33.6	6.6	20.1	- 1.5
Interproduct	-0	-97.2	11.7	-20.0	2.9	-19.6	-	-
Inventory (net)	1.0	-	-4.0	-	-0.9	-	-0.7	-
Imports:	-0	- 0.3	2.4	16.7	3.6	-52.6	2.5	-40.4
Less Exports	0.3	39.6	2.3	-38.0	1.1	2.4 times	1.2	-11.7
Net Imports	-0.3	-39.3	0.1	2.0 times	2.5	-65.5	1.3	-53.9

Table 5

Ontario Net Sales of Petroleum Products 1971 (1)

	<u>Quantities in Thousand Barrels</u>	<u>Percent of Total</u>
Propane (2)	1,509	0.9
Butane & Butane Mixes	85	-
Petro-chemical Feed Stock	7,485	4.4
Naptha Specialties	1,417	0.8
Aviation Gasoline	247	0.1
Motor Gasoline	63,783	37.8
Aviation Turbo Fuel	4,701	2.8
Kerosene, Stove Oil, Tractor Fuel	3,425	2.0
Diesel Fuel Oil	11,541	6.9
Light Fuel Oil (Nos. 2 & 3)	39,672	23.5
Heavy Fuel Oil (Nos. 4, 5 & 6)	27,781	16.5
Asphalt	4,559	2.7
Coke	206	0.1
Lubricating Oil & Grease	2,137	1.3
Other Products	317	0.2
	<hr/>	<hr/>
Total All Products	168,865	100.0
	<hr/>	<hr/>

(1) Based on data from DBS Monthly Report No. 45-004

(2) Represents Ontario refinery production from crude oil only.

Table 6

ONTARIO REFINING CAPACITY 1971

Primary Distillation Capacity at Year End
in Thousands of Barrels per Calendar Day.

Shell:	Oakville	40.0
	Corunna	56.0
Gulf:	Clarkson	55.4
B.P.:	Trafalgar	36.0
Imperial:	Sarnia	126.8
Texaco:	Port Credit	40.0
Sun Oil:	Sarnia	33.0
		<hr/>
Total Ontario	- B/CD	387.2
	- as percent of Total Canada	22.5
(Total Quebec	- as percent of Total Canada	33.3)

NATURAL GAS IN ONTARIO

General

Natural gas consumption in the province during 1971 increased 13 percent reflecting some levelling-off from the 1970 advance of 15 percent over the previous year. Relatively lower receipts from Western Canada were supplemented by stepped-up withdrawals from gas storage, higher imports from the U.S.A. and, to a lesser degree, by lower exports. Following the trend of increasing costs and prices of other types of energy, current developments may raise natural gas prices somewhat above their relatively stable levels of the past few years.

Gas Supplies

Supplies from Western Canada advanced almost 5 percent which reflected a substantial easing from increases of 30 percent in 1970 and 38 in 1969, latterly the first complete year following construction of the new pipeline through the U.S.A. The relatively lower Western gas receipts were offset partially by a 32 percent increase in imports from the U.S.A. advancing their contribution to total requirements to nearly three percent from over two in 1970. While Western gas provided over 90 percent of total supply, movements through the province mainly to Northwestern New York State declined over 4 percent compared with 1970's doubling of exports over 1969. Exports through the Rainy River area of Northwestern Ontario cumulated to 20 percent of total exports from initial movements early in the year.

Natural gas consumed mainly in compressor stations and other transmission facilities increased 6 percent, up from 5 percent in 1970, while accounting for a similar ratio of gas received from Western Canada.

Native Ontario gas production supplied around three percent of the total as in 1970 and showed a similar rate of decrease over that year.

Storage

Operations of natural gas storage facilities reflected important changes over 1970 mainly because of the lower rate of increase in supplies from Western Canada. Injections into storage decreased 4 percent, compared with a 1970 advance of 45 percent, mainly due to a lower two percent rate of increase at mid-year followed by a drop of nearly 9 percent by the September-end termination of the summer injection period. This decline arose from the necessity for diverting substantial supplies directly to distribution lines instead of to storage to meet increasing sales demands from early summer onward. Withdrawals from storage increased over 40 percent compared with 9 percent in 1970 particularly during the first and fourth quarter peak demand periods.

Storage facilities are being augmented as in prior years by conversion of former producing pools to maintain adequate facilities for storing the increasing supplies needed to meet demands especially during the peak winter consuming periods.

Sales

Sales of natural gas to Ontario consumers increased over 13 percent compared with 15 in 1970, maintaining their ratio of total sales to consumers in Canada at around 45 percent as for 1970. Residential consumers and sales increased over three and nearly 4 percent respectively compared with almost 5 percent for both in 1970. Commercial sales advanced over 15 percent compared with nearly 13 in 1970, while consumers increased 5 percent down from almost 10 percent. Residential and commercial consumption combined advanced to 9 from 8 percent in 1970, while accounting for over 40 percent of total sales compared with 45 in 1970.

Industrial consumption increased nearly 17 percent compared with over 20 in 1970, accounting for over 55 percent of total sales which compares with 1970. Industrial users increased 6 percent down from nearly 11 percent. During the fourth quarter, industrial sales advanced 16 percent compared to 14 in the first quarter. A significant cause of this higher rate of increase were the volumes consumed in electrical generation at the Ontario Hydro's Hearn thermal plant in Toronto. Compared with relatively minor quantities so consumed in prior years and through most of 1971, consumption of major volumes commencing in October cumulated to over three percent of total industrial sales by the year end.

It is understood that at least one other thermal generating plant burning coal is under study towards conversion to natural gas to reduce air pollution. A further pollution control measure being tested by a major Ontario gas distributor is the conversion

of a group of fleet vehicles to use natural gas mainly with gasoline as a secondary fuel.

Natural Gas Prices

The constantly increased demand for natural gas in the province has necessitated frequent and increasingly costly additions to pipeline facilities to bring supplies from Western Canada to consumer markets. To enable Trans Canada Pipe Lines to obtain short-term financing for its extensive 1972-73 program, the National Energy Board authorized an interim rate increase of around two cents per Mcf to be charged on their deliveries to Ontario distributors effective from January 1, 1972. This interim increase is subject to the outcome of an application by Trans Canada to increase its overall tariff structure to be considered by the Board during 1972.

Producers of natural gas in Western Canada have been pressing for higher wellhead prices. With little additions made to gas reserves in Western Canada over the past couple of years, producers stress that the higher prices for their output are necessary before undertaking the advancing costs of drilling and other extensive work essential to bringing in new supplies, especially in the more inaccessible and costly areas now remaining. The combination of increased wellhead prices and transmission charges when authorized eventually may result in higher prices of natural gas for Ontario consumers.

Increased prices for gas, along with needs to conserve existing supplies, may necessitate adoption of measures such as

selective end-use which could curtail the substantial quantities being consumed in thermal generation of electricity to reduce pollution. Another conservation measure being considered is more active development of the natural gas fuel cell toward making it economically feasible for installation in residential and other applications. 1972 may see some fuel cells in operation at some points in Canada as well as in the U.S.A.

Table 7

Ontario Natural Gas Balance 1971

	Thousands Cubic Feet*	Percent of Change <u>Total</u> <u>over 1970</u>	
<u>Supply</u>			
Ontario production	16,167,731	3.2	-2.9
Receipts from			
Western Canada	485,482,472	92.3	4.7
U.S.A.	<u>14,235,793</u>	2.7	32.4
	499,718,265		
Gas from Storage(Net)	9,416,219	1.8	-
Propane Air	<u>6,500</u>	-	-
Total Supply	525,308,715	100.0	6.9
<u>Disposition</u>			
Sales to consumers	459,604,766	87.3	13.3
Free Gas	1,109,068	0.2	39.5
Company Use	<u>26,675,479</u>	5.1	6.1
	<u>27,784,547</u>		
Total Consumption	487,389,313	92.6	13.0
Gas to Province of Quebec (Net)	1,934,094	0.5	46.9
Exports to U.S.A.	32,230,166	6.1	-4.2
Metering, Line Loss & other Unaccounted for	<u>3,755,142</u>	0.8	-
	<u>37,919,402</u>		
Total Disposition	525,308,715	100.0	6.9

At 14.73 psia

Table 8

Natural Gas Sales in Ontario 1971
Comparative Totals by Consumers Categories

Percent Changes 1971

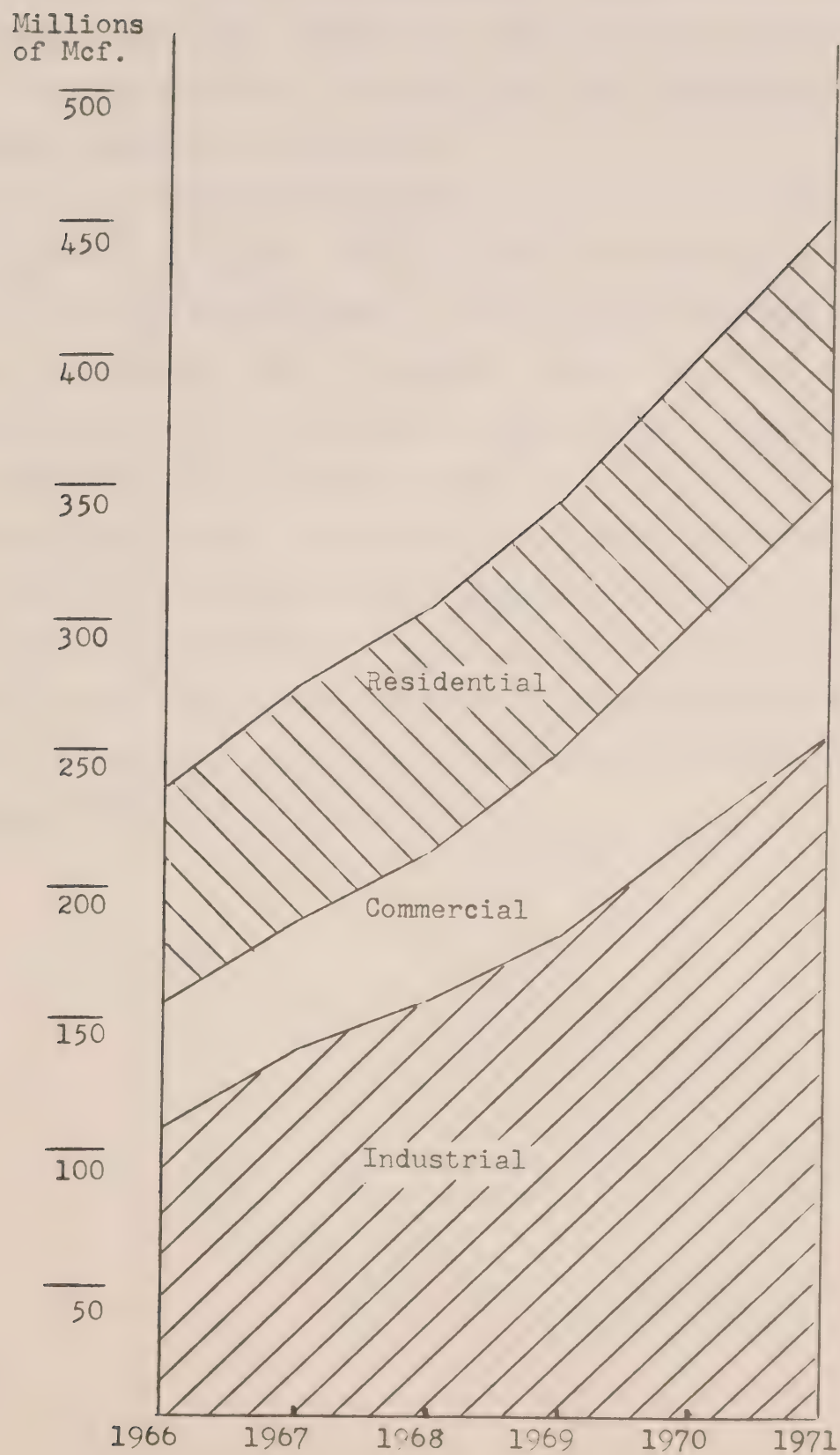
over 1970

over 1966

<u>Category of Customer</u>	<u>Number of Customers</u>	<u>Quantities</u>	<u>Number of Customers</u>	<u>Quantities</u>	<u>Number of Customers</u>	<u>Quantities</u>
Residential	773,923	105,174,570	3.5	3.8	18.7	28.4
Commercial	75,642	93,425,248	5.1	15.5	35.0	2.2 times
Industrial	9,485	261,004,948	6.0	16.9	35.5	2.2 times
TOTALS	859,050	459,604,766	3.7	13.3	20.2	90.6

Figure 4

Natural Gas Sales by Year and Category



PROPANE IN ONTARIO

Propane supplies received from Western Canada and Ontario oil refineries and their sales and other disposition decreased substantially over 1970, reflecting lower demand by distributor outlets, the petro-chemical industry and other components of the propane market in the province.

Receipts processed from natural gas mainly in Western Canada comprised the major portion of the contribution of propane to Ontario's total energy supply. While supplies refined from crude oil are a major part of propane receipts, they are a small but important portion of refined petroleum products supplies covered elsewhere in this report under "Oil".

Underground propane storage facilities were increased during the year by the development of salt-type reservoirs to augment the transport-storage complex in the Sarnia area for handling natural gas liquids and other hydrocarbons being shipped in batches through the facilities of the Interprovincial Pipe Line Company from Western Canada.

Table 9

Propane Receipts and Disposition in Ontario1971

In Barrels

		<u>Percent</u>	
	Volumes	Total	Change 1971/70
<u>SUPPLY</u>			
Refinery production	2,080,345	55.1	- 1.3
Interprovincial transfers IN	1,856,465	49.2	- 18.8
OUT	<u>9,611</u>		- 41.0
Net transfers	1,846,854	48.9	- 18.6
Inventory changes	<u>- 46,006</u>		
Net Canadian Supply	3,881,193	102.8	- 15.5
Imports	2,482		
Less Exports	<u>106,425</u>		
Net Imports	<u>- 103,943</u>	- 2.8	
TOTAL SUPPLY	3,777,250	100.0	- 17.4
<u>DISPOSITION</u>			
Petro-chemical and Industrial	288,067	7.6	- 69.3
Distributors ¹	<u>3,294,551</u>	87.3	- 9.9
Sub-total	3,582,618	94.9	- 23.7
Plant and refinery use	115,603	3.0	
Losses or gains	- 576		
Adjustments	<u>79,605</u>	2.1	
TOTAL DISPOSITION	3,777,250	100.0	- 17.4

Note 1. Identifiable industrial sales are included. Distributor sales may contain sales to industrial.

PIPELINES IN ONTARIO

General

The extensive pipeline network for transporting hydrocarbons to and within Ontario maintained its continuous growth toward meeting the mounting demands for natural gas and crude oil from Western Canada by the province's extensive residential, commercial and industrial complexes. During the year, pipelines increased to provide both for growth in existing markets and demands arising from new industrial and other developments.

Natural Gas Pipelines

Natural gas pipelines in the province comprised around 35 percent of total mileage of gas pipelines in Canada. The southern part of the province accounted for the bulk of a 3 percent advance in distribution lines which included a 22 mile link from the major transmission junction at Maple to bring natural gas to the Hearn electric generating station in Toronto. While Trans Canada Pipe Lines Limited completed a small but important addition to its system during the year, transmission line work also included right-of-way clearing preparatory to its substantial 1972/73 expansion program awaiting approval by the National Energy Board at the year end. The major portion of this pipeline looping project will augment facilities located in Northern Ontario. Also planned is a 400 mile natural gas transmission line connecting Toronto with Montreal.

Oil Pipelines

Crude oil trunk lines increased nearly 24 percent along with the necessary additions to pumping capacities to handle the steadily advancing movements of crude oil to Ontario refineries. 1971 additions to oil products pipelines included a 60 mile looping of Sun Canadian Pipe Line Company's Sarnia-Toronto connection accompanied with correspondingly greater pumping facilities, and Trans-Northern's 3.5 mile extension to Toronto International Airport to assist in meeting the mounting requirements of this expanding major facility. Plans for 1972 construction mainly include an 18 mile addition to Interprovincial Pipe Line's crude oil pipelines from Westover to Buffalo and supporting pumping equipment.

Other Pipelines

A major new project is a 1,600 mile pipeline to carry propane and other natural gas liquids to Sarnia from Western Canada through the U.S.A. Commencement of construction planned for 1973 is awaiting approvals by the National Energy Board and other authorizing agencies.

Table 10

Pipeline Mileage in Ontario - 1971

	<u>Miles</u>	<u>Percent Increases 1971/1970</u>
<u>Natural Gas Pipelines</u>		
Gathering	1,167	-4.3
Transmission	3,662	1.2
Distribution	15,977	3.1
	<hr/>	<hr/>
Total	20,806	2.3
 <u>Oil Pipelines</u>		
Crude Oil Trunk Lines	391	23.7
Oil Product Lines	934	7.4
	<hr/>	<hr/>
Total	1,325	11.7
 Total All Pipelines	<hr/> 22,131	<hr/> 2.8

COAL IN ONTARIO

General

The contribution of coal to the province's energy requirements eased during 1971, compared to 1970 increases over 1969 in receipts from the U.S.A. and other provinces. Imports of coal into Ontario accounted for nearly 95 percent of the all-Canada total and over 45 percent of all coal receipts in Canada. As for 1970, the bulk of Ontario's supply was used for thermal generation of electricity.

Supply and Consumption

Total demand (including withdrawals from inventory) decreased 12 percent, off substantially from the 1970 advance of 11 percent. Imports of bituminous coal declined over 7 percent, while accounting for around 95 percent of total provincial supply as for 1970. Coal inventories by the close of the year were off from those at the close of 1970, having been reduced to offset lower receipts during the year.

Supplies of lignite from Saskatchewan used mainly for thermal generation dropped nearly 75 percent necessitating sizeable inventory withdrawals, even to meet 20 percent less demand. Bituminous coal from Nova Scotia increased nearly 17 percent compared with a 1970 drop of 50 percent. Bituminous from Western Canada dropped over 80 percent from 1970 when a substantial advance over 1969 resulted from receipts of over 160,000 tons on

a one-time experimental basis for steel-making. Requirements for anthracite coal dropped nearly 50 percent over their relatively small 1970 volumes.

Industrial use eased slightly over 1970 off from the 1970 increase of 6 percent. Coal maintained its position as a major fuel for thermal generation of electricity with over 9.4 million tons so used for an 11 percent increase, compared with a 1970 advance of 25 percent. Out of the total consumption of electricity in Ontario, about 35 percent was provided by thermal generation from coal as for 1970. While use for thermal generation increased, consumption in industrial and other applications eased.

Reserves of lignite located in the Onakawana region of Northern Ontario have been under study towards their potential use for thermal generation in a proposed nearby plant. While low in sulphur (polluting) content, around 50 percent of this type of lignite is water with consequently lower BTU potential per ton compared with bituminous coal.

Future Developments

A possible decline in the future use of coal for thermal generation may arise from many causes. Prices of imported coal at exit ports in the U.S.A. increased further during the year over 1970 advances, and this trend may continue as a result of renewal of labour agreements at more costly levels and other reasons. Western Canada coal producers also experienced higher costs than anticipated leading to probable increases in selling prices there.

Implementation of anti-pollution measures involving conversion to natural gas of part of the coal-burning equipment at Hearn electric generating station in Toronto caused a substantial drop in its coal consumption during the year. Similar conversion of other coal-burning plants being contemplated would have like results. In the near future, fuel oil with its lower sulphur content will begin to be used in at least one new plant. The success of the Pickering nuclear generating station combined with anti-pollution requirements undoubtedly may affect the type of plants designed for future use, especially in relation to the choice of fuels.

Studies to develop techniques for reducing the polluting effect of coal are continuing. In the energy-short U.S.A., coal gasification projects are being considered to augment their reportedly declining natural gas supplies. While their coal reserves are sizeable at present, any extensive requirements for gasification might necessitate some tightening of volumes available for export. Despite all the foregoing indications of possible lower consumption, coal will continue for the foreseeable future as an important fuel along with other forms of energy for thermal generation to supply Ontario's mounting demands for electrical energy.

Table 11

ONTARIO COAL BALANCE 1971

(In thousands of short tons,
rounded to the nearest 1000)

					1971
					Percent Change from 1970
					(1)
					Anthracite
					Bituminous
					Lignite
					Total
<u>Supply</u>					
Domestic: Western Provinces	--	33	136	169	-77.3
Nova Scotia	--	193	--	193	16.9
Total	--	226	136	362	-60.2
Imports: U.S.A.	135	16,797	--	16,932	- 7.3
Total Coal Supply	135	17,023	136	17,294	- 9.8
<u>Demand</u>					
Industrial: Consumption (2)	69	10,383	226	10,678	- 0.7
Net to Inventory (3)	18	- 360	-90	- 432	--
Total Demand	87	10,023	136	10,246	-12.4
Other (4): Total Demand	48	7,000	--	7,048	- 5.8
Total Coal Demand	135	17,023	136	17,294	- 9.8

(1) Includes sub-bituminous in negligible quantities.

(2) Industrial includes electric utilities, mining and manufacturing.

(3) Excludes stocks held by firms using less than 1000 tons per year
and stocks held by coke producers.(4) Retail to residential, commercial and small industrial users including
railway, ship bunker, government and institutional consumption.

Source: Statistics Canada Catalogue No. 45-002

ELECTRICITY IN ONTARIO

General

Electricity consumed in Ontario during 1971 totalled nearly 73 billion kilowatt-hours, up 5 percent from 1970 compared with a 1970 advance of over 7 percent over the previous year. Sources changed with more than 50 percent of the total supplied by hydro and over 40 by thermal, compared with corresponding 1970 ratios of over 56 and 34 percent respectively. A significant development in thermal generation was initial major output from the new Pickering nuclear plant, adding a further 5 percent to bring all thermal to its new 40 percent level. Nuclear-generated electricity was about four times that of 1970 when its ratio was around one percent of total supply. The balance of supplies were net transfers from other provinces and imports from the U.S.A. Nuclear plants experienced continued heavy water shortages from 1970, while future demands for uranium may draw heavily on existing reserves necessitating increased exploration.

Supply

Electricity thermally-generated is challenging for the first time the previous dominance of that generated from water power. Thermal generation increased around 22 percent, compared with around 20 in 1970, while hydro supplies decreased well over two percent as for 1970.

Ontario Hydro brought new capacity on line totalling 1.3 million kilowatts during 1971. The hydro-electric addition was

the Lower Notch 228 megawatt (mw)* station. The significant bulk of added capacity was from the first two 540 mw units of the 2,160 mw Pickering nuclear station brought into service and operating up to nearly 100 percent of capacity during the latter part of the year. The third Pickering unit is planned to commence operating in the Spring of 1972 and the fourth in 1973. Construction work on the oil-fired Lennox 2,295 mw station near Kingston progressed toward first power expected in late 1974 and negotiations for oil supplies were under way by the year-end.

The conversion of the Hearn coal-burning station in Toronto to use natural gas was completed during the year of which four units will burn gas and the remaining four both coal and gas. By the year end, Hearn consumed over 8 billion cubic feet of natural gas while using over 30 percent less coal.

Nuclear Power Plants

Nuclear power activities in Ontario reflected some interesting developments during 1971. Out of total nuclear generated electricity of around 3.9 billion kwh, Pickering's initial output accounted for over 70 percent and the balance mainly from the Douglas Point 200 mw plant, latterly representing a 4 percent increase over 1970. The Douglas Point station's many operating problems and related corrective measures have proven it to be a most useful prototype in the development of the Pickering station and the new 3,000 mw Bruce plant now being constructed at Douglas Point. The first of the four 750 mw Bruce units is to

* One megawatt = 1,000 kw = 1,000,000 watts

begin operating in 1975. This plant will include refinements based on experience with other CANDU units, such as only two fuelling units needed to serve the four reactors, and an oil-fired steam generating plant to supply emergency steam.

Heavy Water

The Bruce heavy water production plant also being constructed in the Douglas Point area showed substantial progress by the year end, with initial output from the first of two 400-ton-per-year units planned for 1972. An interesting adjunct to this project is the steam generating plant built to supply extra steam for the heavy water plant and nearby generating stations. The steam plant will be fuelled by heavy fuel oil to be transported from Montreal by Canada's first continuous unit oil train. When in complete operation, the train will run around the clock, taking 72 hours to complete the 1,200 mile trip.

Sources of heavy water essential to Ontario's nuclear power programme were in short supply as in 1970 but some improvement is expected over the next couple of years. The shortage initially stemmed from the failure of the 400-ton-per-year plant at Glace Bay, Nova Scotia, to produce and its eventual shut-down for almost complete re-structuring with the assistance of the Federal Government. Following modifications to correct 1970 producing problems, the Point Tupper, Nova Scotia, 400-ton plant was brought up to over 50 percent of full capacity by the year end and is expected to further increase output during 1972. The major bulk of 1971's heavy water supply was imported, mainly from

the U.S.A., the United Kingdom and Russia and these foreign sources will continue to be depended upon for the near future. Should Pickering No. 3 unit be ready to come on stream by the spring of 1972 as planned, 500 tons will be required for that unit alone. Consequently, tightness of heavy water supplies will continue through 1972 possibly necessitating temporary closing of some smaller nuclear plants to enable shifting of heavy water to Pickering.

Uranium

Uranium reserves particularly in Ontario reportedly are sufficient at present to meet estimated demands for fuelling nuclear power plants now operating, under construction and planned, and export commitments over the next few years. However, more exploration and development than recently carried out now is necessary to maintain supplies. Higher selling prices have been suggested to provide the necessary incentives and to cover the increasing costs associated with exploration and development activities.

Table 12

Electric Energy Balance 1971

		<u>Ontario (1)</u>		<u>HEPCO (2)</u>
		Billions (10 ⁹)kwh	Percent Change over 1970	Billions (10 ⁹)kwh
<u>Supply</u>				
Utilities Generation	- Hydro	36.5	(- 2.7)	34.8
	- Thermal			
	Conventional	25.4	(13.2)	25.4
	Nuclear	3.9	(4.1 times)	3.9
	- Total	65.8	(8.0)	64.1
Industry Generation	- Hydro	1.5	(- 6.2)	
	- Thermal	1.1	(-15.3)	
	- Total	2.6	(-10.3)	
Total Generation	- Hydro	38.1	(- 2.6)	34.8
	- Thermal			
	Conventional	26.5	(18.2)	25.4
	Nuclear	3.9	(4.1 times)	3.9
	- Total	68.5	(7.4)	64.1
Net Purchases	³	4.4	(-21.4)	4.5(3)
Total Supply		72.9	(5.0)	68.6
<u>Disposition</u>				
Sales	- Industrial	27.3	(5.8)	
	- Commercial	10.0	(66.7)	
	- Domestic & Farm	15.9	(10.4)	
	- Street Lighting	0.4	-	
	- Total Sales	53.6	(10.3)	
Own Plant Use		7.1	-	
Unallocated and Distribution By Non-respondents		12.2	(-10.9)	
Total Disposition		72.9	(5.0)	

(1) Statistics Canada 57-001

(2) Hydro-Electric Power Commission of Ontario

(3) Other Provinces and USA only; excludes transfers within Ontario and Purchases from AECL Douglas Point Nuclear G.S. included in "Nuclear".

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Table of Contents

	<u>Page No.</u>
Highlights	1
Primary Energy Consumption in Ontario	2
By Source in Percent - Figure 1	3
By Source in BTU - Figure 2	4
Annual Percent Increases - Table 1	5
Oil in Ontario	6
Oil Balance Sheet - Table 2	7
Canadian Oil Requirements - Table 3	8
Sources of Refined Products - Table 4	10
Sales of Products - Table 5	11
Oil Refinery Capacities - Table 6	13
Natural Gas in Ontario	16
Gas Balance Sheet - Table 7	17
Sales by Category - Table 8	19
Propane in Ontario	21
Propane Receipts and Disposition - Table 9	22
Pipelines in Ontario	23
Pipeline Mileage - Table 10 ...	24
Coal in Ontario	25
Coal Balance Sheet - Table 11 ...	26
Electricity in Ontario	29
Electric Energy Balance - Table 12 ...	30

ENERGY HIGHLIGHTS IN ONTARIO 1972

Energy consumption in Ontario rose significantly in 1972. Oil was the major source of energy. Natural gas and nuclear energy gained in thermal generation while electricity use was higher.

Receipts of crude oil from Western Canada and refinery production changed slightly. Refined products from other provinces and offshore were higher. Imported crude rose and Ontario crude production declined. Prices were higher for domestic crude as were product prices in Eastern Ontario.

Natural gas deliveries from Western Canada were notably up. Imports showed a lower rate of advance while exports were down. Storage operations changed little, while native Ontario gas production declined.

Coal imports from the U.S.A. were higher and provided the bulk of Ontario's coal supplies, 50 percent of which was used for thermal generation of electricity.

The operating success of the Pickering Generating Station was a significant achievement of Ontario's expanding nuclear power program.

PRIMARY ENERGY CONSUMPTION IN ONTARIO 1972

Consumption of primary energy supplies in Ontario during 1972 showed important developments. Greater use of all major types of energy was accompanied by substitutions of one type for another maintaining a similar pattern of immediately preceding years. The quantities and changes in primary energy used on a heat-equivalent basis appear in the charts and tables.

Total primary energy consumption in the province was $2,650 \times 10^{12}$ BTU for an eight percent increase. This marked change resulted mainly from increased industrial demand for major forms of energy.

Contributors to Ontario's total energy needs by order of importance were oil, natural gas, electricity and coal. Oil continued as the dominant energy source with an improved rate of increase but lower share of total supply. Natural gas had the greatest rate of advance mainly because of its first complete year's use at the Hearn Thermal Generating Plant in Toronto. Coal continued to be the major fuel for thermal generation despite substantial increases in the use of natural gas and nuclear energy.

Electricity showed the third highest increase partially due to stepped-up thermal generation which was featured by the outstanding success of the Pickering nuclear plant in nearly doubling its 1971 output. Hydro-electric generation rose eight percent, sharply up from 1971's minor drop and materially contributed to the similar rate of increase in consumption of electricity.

Figure 1

Primary Energy Consumption By Source
As Percent Of Total Consumption For 1972

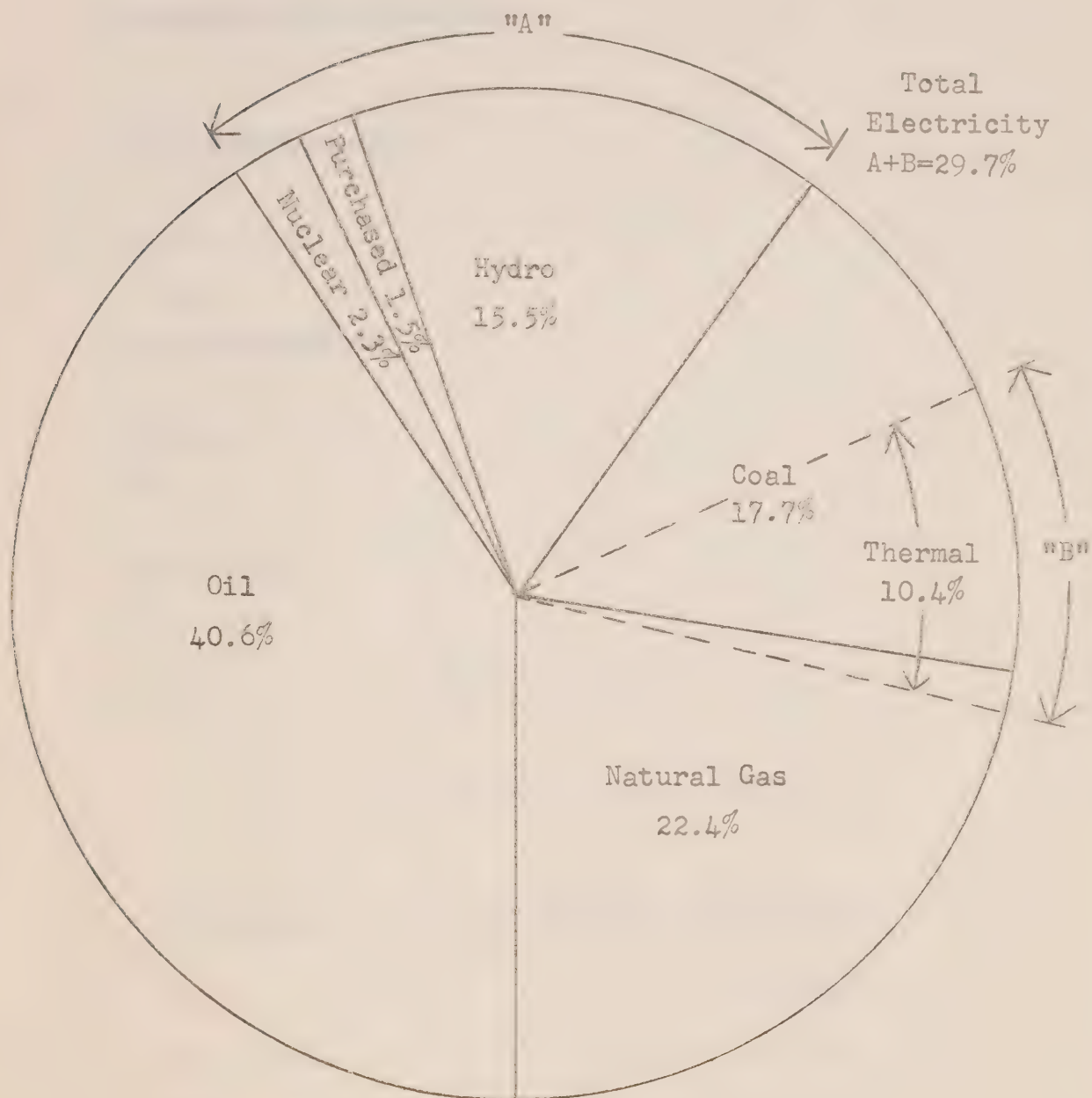
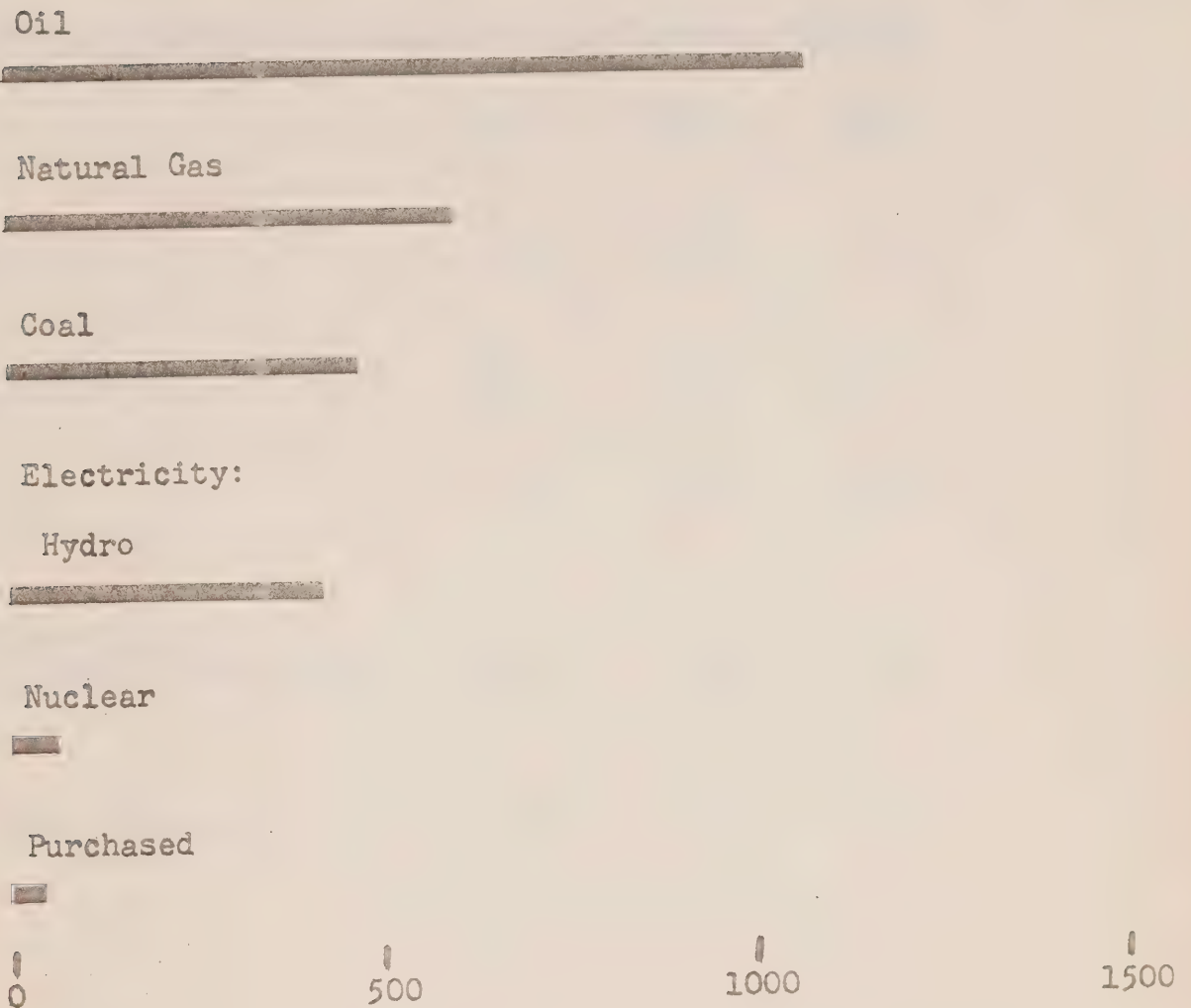




Figure 2

Primary Energy Consumption in Ontario - 1972



Heat Equivalent in 10^{12} BTU

Conversion Factors for Primary Energy Sources

Oil	5.8×10^6 BTU/barrel
Natural Gas	1.0×10^6 BTU/Mcf
Coal	26.2×10^6 BTU/ton
Electricity	10,000 BTU/kilowatt Hour

Table 1

Ontario Energy Consumption Annual Percent Increases

	<u>1972</u>	<u>1971</u>	<u>1970</u>
Oil	3.5	0.6	8.5
Natural Gas	20.3	12.3	14.5
Coal	3.3	-9.8	17.2
Electricity (primary & secondary)	8.1	4.7	7.3
TOTAL Primary Energy	8.2	0.7	10.0

OIL IN ONTARIO

General

Crude oil supplies and refinery production changed little over 1971 while contributing around 40 percent of Ontario's energy requirements. Refined products from other provinces and imported increased. Imports of crude oil rose and native Ontario production declined. Higher prices were charged for Western Canada crude and products sold east of the Ottawa Valley.

Crude Oil Supply

Receipts of crude oil and equivalent from Western Canada increased one percent. Alberta supplies rose 5 percent, providing 70 percent of total receipts. Saskatchewan oil dropped 6 percent and accounted for a further 25 percent. Crude oil from Manitoba declined 20 percent and represented 2 percent of the total. Crude oil from Venezuela increased 4 percent, native Ontario production dropped 8 percent and their combined total provided about one percent of total crude supplies.

The price of Western Canada crude oil rose 10 cents per barrel in November with year-end indications of further increases in 1973. A previous 25 cent increase occurred in 1970.

Table 2Ontario Oil Balance 1972 (1)

<u>Supply</u>		Quantities in Thousands of <u>Barrels</u>	<u>Percent</u>	
			<u>of Total</u>	<u>Change over 1971</u>
Crude Oil	- Ontario Production	878	0.5	- 8.4
(2)	- From Western Provinces	136,599	72.4	1.6
	- Imports from Venezuela	424	0.2	3.9
	- Net Transfers and other Materials	-1,237	-0.7	⊕
	- Total Run to Stills	136,664	72.4	- 1.1
Products	- Transfers from Other Provinces	40,723	21.6	1.8
	- Imports	6,575	3.5	48.8
	- Other Receipts	4,746	2.5	23.6
	- Total Product Receipts	52,044	27.6	7.9
Total Supply		188,708	100.0	1.2
<u>Disposition</u>				
Consumption	- Customer Sales	175,396	92.9	3.8
	- Company Use	9,337	5.0	- 1.0
	- Total Consumption	184,733	97.9	3.6
Other	- Transfers to Other Provinces	3,521	1.9	- 12.5
	- Exports	3,314	1.7	58.8
	- Product Inventory Changes	- 3,489	-1.8	⊕
	- Losses	629	0.3	- 19.2
	- Total Other Disposition	3,975	2.1	- 51.1
Total Disposition		188,708	100.0	1.2

Based on Statistics Canada Monthly Report No. 45-004

(2) Crude Oil, condensate and pentanes plus, comingled propane and butane mixes.

Table 3

Canadian Oil Requirements in Percent of Total for 1972

	<u>Ontario</u>	<u>Prairies & N.W.T.</u>	<u>Quebec & Maritimes</u>	<u>B.C.</u>	<u>Total</u>
Crude Receipts					
Canadian	23.6	15.1	-	8.2	46.9
Imported	0.1	-	49.5	-	49.6
Total	23.7	15.1	49.5	8.2	96.5
Net Product Imports	0.5	-	1.7	0.8	3.0
Provincial Transfers (1)	6.8	- 0.7	- 6.3	0.7	0.5
Total Consumption	31.0	14.4	44.9	9.7	100.0

(1) Product transfers between provinces plus other materials to stills plus inventory changes.

Refined Petroleum Products

Output of products from Ontario's oil refineries decreased one percent. The province's proportion of total Canadian refinery production declined to 24 percent. Its reduced output was notably down from an all-Canada 10 percent advance.

Selling prices of motor gasoline and fuel oils rose one cent per gallon early in the year east of the Ottawa Valley National Oil Policy Line, following previous months' advances in prices of Venezuela crude used to make products in Quebec and marketed in Eastern Ontario. Year-end indications are for a similar 1973 pattern of higher product prices following crude price increases.

Net transfers of products mainly from Quebec rose 3 percent and together with refinery output provided 95 percent of total consumption. Of significant product sources, motor gasoline showed the highest refinery output ratio and relatively lower dependence on interprovincial transfers, compared to almost the opposite situation for light and heavy fuel oils. These three fuels comprised 80 percent of transfers and 30 percent of net imports.

Sales of refined products rose 4 percent and accounted for 30 percent of total sales in Canada. Percent changes in sales of major products were gasoline up 6, light fuel oil up 4, heavy fuel oil down 4 and diesel up 6 percent.

Table 4

Sources of Three Significant and All Petroleum Products 1972

Expressed as Percent of Consumption and Changes over 1971

	Motor Gasoline		Light Fuel Oil		Heavy Fuel Oil		All Products	
	Consumption	Percent Change over 1971	Consumption	Percent Change over 1971	Consumption	Percent Change over 1971	Consumption	Percent Change over 1971
Refinery production	84.0	7.1	59.1	- 9.1	59.0	- 6.6	73.8	- 1.1
Transfers:								
Interprovincial - IN	14.3	5.0	19.5	-11.0	38.9	11.0	22.0	1.8
OUT	0.8	-14.4	0.4	-35.1	1.4	7.0 times	1.9	-12.5
NET	13.5	6.5	19.1	-10.2	37.5	7.7	20.1	3.4
Interproduct	0.6	3.6	10.6	- 5.4	2.0	-34.2	---	---
Inventory (net)	0.4	-58.3	7.1	---	0.6	---	1.9	---
Imports:	---	2.4 times	3.8	68.6	6.5	74.1	3.5	48.9
Less Exports	0.1	-63.8	1.5	-30.0	6.1	5.1 times	1.8	58.8
Net Imports	-0.1	-64.3	2.3	26.2 times	0.4	-83.7	1.7	40.0

Table 5

Ontario Net Sales of Petroleum Products 1972 (1)

	<u>Quantities in Thousand Barrels</u>	<u>Percent of Total</u>
Propane (2)	1,389	0.8
Butane & Butane Mixes	227	0.1
Petro-chemical Feed Stock	8,016	4.6
Naptha Specialties	1,546	0.9
Aviation Gasoline	255	0.1
Motor Gasoline	67,741	38.6
Aviation Turbo Fuel	4,941	2.8
Kerosene, Stove Oil, Tractor Fuel	3,139	1.8
Diesel Fuel Oil	12,198	7.0
Light Fuel Oil (Nos. 2 & 3)	41,480	23.7
Heavy Fuel Oil (Nos. 4, 5 & 6)	26,661	15.2
Asphalt	4,836	2.8
Coke	229	0.1
Lubricating Oil & Grease	2,332	1.3
Other Products	406	0.2
	<hr/>	<hr/>
Total All Products	175,396	100.0
	<hr/>	<hr/>

(1) Based on data from Statistics Canada Monthly Report No. 45-004

(2) Represents Ontario refinery production from crude oil only.

Current and Future Developments

The demand for oil can be expected to increase with development of industry and other sectors of the consuming market and to necessitate expansion of oil refineries' capacity to meet these needs. During the year, Ontario capacity was increased around 20,000 barrels per day but planned future additions are much greater.

BP Canada is to add 40,000 barrels per day (bpd) to its Trafalgar refinery by 1974. The capacity of Texaco's new refinery at Nanticoke reportedly was increased to 95,000 bpd from 50,000 originally planned with a 1976 completion date. Sun Oil is to nearly double its Sarnia plant to 80,000 bpd by 1974. Quebec also is considering greater capacity to provide for expanding markets east of the Ottawa Valley.

The steam plant of the Bruce heavy water plant being built at the Douglas Point nuclear complex reportedly will consume over 300,000 gallons of Bunker"C" oil per day when operating at peak capacity. By the year-end, a unit oil-train was bringing supplies from Montreal to Bruce at the rate of 125 carloads weekly. First heavy water production is expected in early 1973.

A five-year contract was completed with the Golden Eagle refinery near Quebec City to supply 25 million barrels of residual oil, produced from Venezuelan and other imported crude and to be transported by unit-train, to the oil-fired Lennox

Table 6

ONTARIO REFINING CAPACITY 1972

Primary Distillation Capacity at Year End
in Thousands of Barrels per Calendar Day.

Shell:	Oakville	42.0
	Corunna	68.0
Gulf:	Clarkson	55.4
B.P.:	Trafalgar	35.0
Imperial:	Sarnia	129.4
Texaco:	Port Credit	42.0
Sun Oil:	Sarnia	38.0
		<hr/>
Total Ontario	- Thousands B/CD	409.8
	- as percent of Total Canada	23
(Total Quebec	- as percent of Total Canada	33)

Thermal Generating Station under construction near Kingston where initial power output is planned for 1975. Lennox will be able to burn either residual fuel oil or unprocessed crude oil.

A significant continuing problem with imported oil which constitutes 50 percent of Canada's supply is the increasing revenues being demanded by the Middle East countries and Venezuela who constitute the major membership of the Organization of the Petroleum Exporting Countries (OPEC). The Middle East, with half of the world's proven reserves and supplying 30 percent of Eastern Canada's needs, has been steadily raising its crude oil prices and gaining state ownership of oil production operations ranging from 25 percent participation to outright nationalization.

Venezuela, the source of over 50 percent of Canada's oil imports, had year-end plans for higher 1973 taxes on exports and other charges on production. Despite prices higher than those of the Middle East coupled with harbour facilities that do not permit cheaper supertanker transport, Venezuela continues to be a relatively secure source of supply. Supplies from the Middle East countries are subject to further price increases, stronger controls and a changeable political climate. The Middle East is not seen as a secure source of supply. Furthermore, as existing oil supplies are priced higher, alternative potential sources of supply become economic.

The Athabasca tar sands of Northern Alberta are attracting continued interest because of their vast potential for meeting the increasing future demand for oil. Estimated recoverable deposits of this synthetic oil of around 300 billion barrels reportedly are about equal to the proven reserves of the Persian Gulf in the Middle East. The only oil sands plant operating was producing around 50,000 bpd and expecting government authority to expand to 65,000 bpd, while a proposed 125,000 bpd facility also was awaiting permission to commence construction. Some major oil firms reportedly estimate that by year 2000 about 20 plants of the 125,000 bpd size and even larger could be producing around 3 million barrels a day of synthetic oil.

NATURAL GAS IN ONTARIO

General

Consumption of natural gas in Ontario increased 20 percent in 1972. Supplies from Western Canada and imports from the U.S.A. were higher, complemented by increased withdrawals from storage and less exports. This was the first full year natural gas was used for thermal generation of electricity.

Supplies

Receipts from Western Canada increased around 18 percent. Imports from the U.S.A. were up 8 percent. Exports dropped 45 percent continuing a similar trend from the previous year leaving more supplies for domestic needs. Previously substantial movements to the U.S.A. through the Niagara Falls area dropped 60 percent while those near Fort Frances rose 15 percent.

Consumption mainly in compressor and transmission facilities increased almost 25 percent and accounted for 6 percent of gas brought from Western Canada.

Natural gas produced from Ontario fields declined 24 percent and supplied two percent of total supply.

Table 7

Ontario Natural Gas Balance 1972

		<u>Thousands Cubic Feet*</u>	<u>of Total</u>	<u>Percent Change over 1971</u>
<u>Supply</u>				
Ontario production		12,375,129	2.0	-23.5
Receipts from				
Western Canada	571,990,757		93.5	17.8
U.S.A.	<u>15,426,365</u>		2.5	8.4
		587,417,122		
Gas from Storage (net)		12,318,120	2.0	-
Propane Air		<u>7,335</u>	-	12.8
Total Supply		612,117,706	100.0	16.5
<u>Disposition</u>				
Sales to consumers		552,762,868	90.3	20.3
Free Gas	31,746		-	-97.1
Company Use	<u>33,169,118</u>		5.4	24.3
		<u>33,200,864</u>		
Total Consumption		585,963,732	95.7	20.2
Gas to Province of Quebec (Net)	789,699		0.1	-59.2
Exports to U.S.A.	17,732,994		2.9	-45.0
Metering, Line Loss & other Unaccounted for	<u>7,631,281</u>		1.3	-
		<u>26,153,974</u>		
Total Disposition		612,117,706	100.0	16.5

* At 14.73 psia

Storage

Natural gas storage operations changed little over the preceding year even with greater supplies from Western Canada. Injections into storage pools dropped two percent while withdrawals were up only slightly. The resultant 20 percent drop in net volumes in storage reflected the possibly larger movements of Western receipts directly to markets to meet increasing demand.

New storage capacity developed by conversion of former producing pools was added during the year to enable greater inventories to be held for peak demand periods especially during the colder winter months.

Sales

Sales to Ontario natural gas consumers increased 20 percent and accounted for nearly 50 percent of total sales to Canadian consumers.

Residential consumers rose nearly 5 percent while volume sales increased 11 percent. A 5 percent increase in commercial consumers was contrasted with a volume advance of 20 percent. Combined residential and commercial use continued to account for over 40 percent of total sales.

Table 8

Natural Gas Sales in Ontario 1972

Comparative Totals by Consumers Categories

Quantities in Thousands Cubic Feet

Percent Changes 1972

over 1971

over 1967

<u>Category of Consumer</u>	<u>Number of Consumers</u>	<u>Quantities</u>	<u>Number of Consumers</u>	<u>Quantities</u>	<u>Number of Consumers</u>	<u>Quantities</u>
Residential	810,034	117,138,159	4.7	11.4	21.9	31.7
Commercial	79,449	113,773,507	5.0	21.8	35.5	2.2 times
Industrial	9,542	321,851,202	0.6	23.3	32.8	2.3 times
TOTALS	899,025	552,762,868	4.7	20.3	23.1	98.0

Industrial sales rose over 20 percent while the number of consumers advanced only slightly. For the first time, natural gas was used in thermal generation of electricity for a complete year in part of the Toronto Hearn plant to reduce air pollution. Thermal generation accounted for 60 percent of the 1972 industrial increase and 12 percent of total industrial sales.

Other Developments

The National Energy Board authorized an interim rate increase for TransCanada PipeLines of two cents per Mcf from the first of the year chargeable on gas deliveries to Ontario distributors to enable this firm to obtain short-term financing for its sizeable 1972-73 construction program.

Natural gas production carried out mainly in Alberta increased during 1972 but without offsetting new discoveries to add to reserves. However, industry experts reportedly believe that more efficient use of our natural gas resources is of greater importance than new finds, especially in the face of mounting demands for this clean-burning fuel for pollution abatement purposes. In addition to such conservation measures as improved insulation of homes and buildings, use of fuel cells that convert natural gas into electrical energy may be stimulated because of their non-polluting higher efficiency

and lower consumption of gas. Also, the fuel cell, which may be powered by natural gas or a liquid petroleum fuel, permits on-site generation of electricity making it particularly suited to applications in remote locations. Development of fuel cells has occurred mainly in the United States and has reached a level of progress where further work is being directed towards size and cost reduction. Full-scale American units are currently being field-tested in Alberta and Quebec.

PROPANE IN ONTARIO

Propane from Western Canada increased notably while that from Ontario oil refineries decreased. Distributor sales and transfers to the petrochemical industry were substantially higher.

Greater supplies from natural gas processing plants in Western Canada were both the major cause of the improved market for propane and its contribution to Ontario's total energy supply.

Storage for propane underground was increased by the development of more salt cavern reservoirs to complement the important transport-storage facilities of the Sarnia area.

Table 9

Propane Receipts and Disposition in Ontario1972

In Barrels

		<u>Percent</u>	
	Volumes	Total	Change 1972/71
<hr/>			
<u>SUPPLY</u>			
Refinery production	1,916,491	44.2	- 7.9
Interprovincial transfers IN OUT	2,506,065 <u>16,763</u>	57.8	62.4
Net transfers	2,489,302	57.4	62.4
Inventory changes	<u>- 58,766</u>		
Net Canadian Supply	<u>4,347,027</u>	100.2	21.8
Imports	3,111		
Less Exports	<u>14,103</u>		
Net Imports	<u>- 10,992</u>	- 0.2	
TOTAL SUPPLY	<u>4,336,035</u>	100.0	25.2
<hr/>			
<u>DISPOSITION</u>			
Petro-chemical and Industrial	539,217	12.4	87.2
Distributors ¹	<u>3,610,139</u>	83.3	22.9
Sub-Total	4,149,356	95.7	28.6
Plant and refinery use	109,025	2.6	
Losses or gains	5,471		
Adjustments	<u>72,183</u>	1.7	
TOTAL DISPOSITION	<u>4,336,035</u>	100.0	25.2

Note 1. Identifiable industrial sales are included. Distributor sales may contain sales to industrial.

PIPELINES IN ONTARIO

The considerable network of pipelines for moving hydrocarbons into and within the province continued its growth in meeting demands of the extensive residential, commercial and industrial sectors. Increases provided both for existing markets and new developments.

Natural Gas Pipelines

Pipelines for moving natural gas in Ontario accounted for around 30 percent of all gas pipelines in Canada. The 1972 additions to distribution lines were in the proportion of about one-third in northern Ontario and the remainder in the southern sector. TransCanada PipeLines completed over 600 miles of its 1972-73 transmission line looping program, of which the major portion was in northern Ontario, as well as about 30 miles of its Toronto-Montreal line.

Oil Pipelines

Interprovincial Pipe Line added 18 miles between Westover and Buffalo to its major oil trunk line extending from Western Canada. Interprovincial's 1973 program calls for construction of 28 miles of their second line between Sarnia and Port Credit.

Sun-Canadian Pipeline's 1973-1974 plans are for a 120 mile addition to their Sarnia-Toronto products line, of which 60 miles were completed during 1971.

Table 10

Pipeline Mileage in Ontario - 1972

	<u>Miles</u>	<u>Percent Increases 1972/1971</u>
<u>Natural Gas Pipelines</u>		
Gathering	1,101	-5.9
Transmission	4,344	18.6
Distribution	16,570	3.6
	<hr/>	<hr/>
Total	22,015	5.8
 <u>Oil Pipelines</u>		
Crude Oil Trunk Lines	415	4.6
Oil Product Lines	850	-
	<hr/>	<hr/>
Total	1,265	1.4
 Total All Pipelines	<hr/> 23,280	<hr/> 5.9

COAL IN ONTARIO

General

Consumption of coal in Ontario rose during 1972. Imports were higher and provided the major bulk of supplies while transfers from other provinces were lower. Approximately one-half of all coal receipts were used for thermal generation of electricity.

Supply and Consumption

Demand increased over 3 percent. Bituminous coal imports increased 5 percent and provided over 95 percent of total Ontario supplies. Inventories by the year end were higher.

Saskatchewan lignite mainly consumed in thermal generation of electricity in Northwestern Ontario dropped 75 percent and accounted for most of the 50 percent decrease in Western Canada supplies. Bituminous coal from Nova Scotia was down about 90 percent while that from Western Canada rose 30 percent. Anthracite coal receipts dropped 30 percent.

Industrial demand was essentially unchanged. Coal continued as a dominant fuel for thermal generation of electricity and produced around 30 percent of total 1972 electricity supply. However, 8 million tons so used represents a decrease when compared to 9.4 million tons for 1971. Other

Table 11

ONTARIO COAL BALANCE 1972

(In thousands of short tons, rounded to the nearest 1000)

					1972
					Percent Change from 1971
					(1)
	<u>Anthracite</u>	<u>Bituminous</u>	<u>Lignite</u>	<u>Total</u>	
<u>Supply</u>					
Domestic: Western Provinces	--	48	32	80	-52.7
Nova Scotia	--	15	--	15	-92.2
Total	--	63	--	95	-73.8
Imports: U.S.A.	100	17,670	--	17,770	5.0
Total Coal Supply	100	17,733	32	17,865	3.3
<u>Demand</u>					
Industrial: Consumption (2)	61	9,310	35	9,406	-11.9
Net to Inventory (3)	(4)	908	(10)	894	--
Total Demand	57	10,218	25	10,300	0.5
Other (4): Total Demand	43	7,515	7	7,565	7.3
Total Coal Demand	100	17,733	32	17,865	3.3

(1) Includes sub-bituminous in negligible quantities.

(2) Industrial includes electric utilities, mining and manufacturing.

(3) Excludes stocks held by firms using less than 1000 tons per year and stocks held by coke producers.

(4) Retail to residential, commercial and small industrial users including railway, ship bunker, government and institutional consumption.

Source: Statistics Canada Catalogue No. 45-002

fuels offsetting coal's decreased use in thermal generation were natural gas and uranium.

Research and assessment of the Onakawana lignite reserves in Northern Ontario is to be carried out jointly by the Ontario Government and the Manalta Coal Company of Calgary. Burning capacities of this lignite and the economics of developing estimated reserves of 150 million tons will be investigated towards the possibility of generation of electricity from an on-site plant.

Future Developments

A combination of factors may affect the use of coal for thermal generation of electricity. Prices of coal imported from the U.S.A. rose again following a trend from 1970. As shortages of natural gas continue there, coal gasification projects reportedly are on the up-swing but with no known indication whether this use of coal will affect supplies available for export to Canada. Research of methods to remove pollutants from coal are continuing but meanwhile anti-pollution measures limit its use in thermal generation and other applications.

Bituminous coal reserves in Western Canada reportedly have a lower sulphur or polluting content than similar coal from the U.S.A. but the present freight rate to Ontario makes it too costly to replace U.S. with Western coal. However, the

current trend of increasing U. S. import prices could reach a level where the delivered cost of Western coal becomes comparable, especially when a premium value is placed on the relatively lower sulphur content of coal from Western Canada.

Methods of transporting coal such as in slurry pipelines are being studied for moving coal from Alberta to the Pacific Coast for export. A version of this slurry technique is being considered for shipment of Western coal to Ontario thermal generating plants.

ELECTRICITY IN ONTARIO

General

Consumption of electricity in Ontario rose during 1972. Pickering's nuclear generating Unit No. 3 came into service by mid-year, notably pushing up electricity from this source. Net transfers from other provinces and imports from the U.S.A. decreased although quantities were larger. Shortages of heavy water necessitated transfers from other plants to start up Pickering No. 3. The first two units of the Bruce heavy water plant approached initial output. The Nanticoke coal-burning plant produced first power.

Supply

Water power contributed over 50 percent of electricity supplies and thermal generation 40 percent with increases of 8 and 10 percent, respectively, over 1971. Of thermal, nuclear nearly doubled and provided about 8 percent of total electricity. Consumption advanced 8 percent up from 1971's increase of 5 percent.

The third 540 MW* Pickering nuclear unit was operating by early summer while the first 500 MW Nanticoke coal-fired unit started up. Construction of some major components at the Lennox oil-fired station was completed and a five-year contract for 25 million barrels of oil was signed. At the

* 1 megawatt = 1000 kW = 1 million watts

Table 12

Electric Energy Balance 1972

	Ontario (1)		HEPCO (2)
	Billions (10 ⁹)kwh	Percent Change over 1971	Billions (10 ⁹)kwh
<u>Supply</u>			
Utilities Generation - Hydro	39.6	(8.0)	37.6
- Thermal			
Conventional	26.0	(2.3)	26.0
Nuclear	6.1	(57.1)	6.1
- Total	71.7	(9.0)	69.7
Industry Generation - Hydro	1.6	(6.7)	
- Thermal	1.5	(36.4)	
- Total	3.1	(19.2)	
Total Generation - Hydro	41.2	(8.0)	37.6
- Thermal			
Conventional	27.5	(3.8)	26.0
Nuclear	6.1	(57.1)	6.1
- Total	74.8	(9.0)	69.7
Net Purchases ³	4.0	(- 5.9)	4.2
Total Supply	78.8	(8.1)	73.9
<u>Disposition</u>			
Sales - Industrial	29.4	(7.7)	
- Commercial	10.7	(7.0)	
- Domestic & Farm	17.6	(10.7)	
- Street Lighting	0.4	--	
- Total Sales	58.1	(8.4)	
Own Plant Use	7.4	(4.2)	
Unallocated and Distribution by Non-respondents	13.3	(9.0)	
Total Disposition	78.8	(8.1)	

(1) Statistics Canada No. 57-001

(2) Hydro-Electric Power Commission of Ontario

(3) Other Provinces and U.S.A. only; excludes transfers within Ontario.

Hearn station, the last of 8 units being changed over to using natural gas first burned this fuel in early spring.

An 87 MW hydro-electric plant is to be built near Arnprior starting in 1973.

Nuclear Power Plants

Significant nuclear plant developments occurred during the year. Pickering accounted for the bulk of nuclear generation as Douglas Point was closed down last spring along with the Nuclear Power Demonstration Unit at Rolphton and their heavy water transferred to start up Pickering No. 3. Since Douglas Point is needed as a stand-by steam source for the Bruce heavy water production, its heavy water was replenished in December from the Gentilly 200 MW station in Quebec.

Pickering No. 4 is expected to produce power by early summer of 1973. The first reactor assembly of the Bruce 3,000 MW generating station arrived in early summer and first power is expected in 1975. Because of the extent of the future demands for electricity, four more nuclear units are contemplated for both Pickering and Bruce, and a 3,000 MW station near Bowmanville. At Gentilly, a 600 MW plant is expected to be in service by 1979.

Heavy Water

Shortages of heavy water continued from 1971. In addition to the transfers to Pickering from other plants, imports were obtained mainly from the U.S.A. and Russia. The working capacity of the Point Tupper, Nova Scotia, 400-ton per year heavy water plant was improved to around 65 percent from 50 percent in 1971. Initial output from the first of two enriching units of the 800-ton Bruce plant is expected in early 1973. By 1974, all heavy water supplies are expected to come from domestic sources. Bruce's nearby oil-fired steam plant is expected to consume over 300,000 gallons of Bunker "C" oil per day. By the year end shipments were being made from Montreal in 125 train-carloads each week. This is to increase to over 60 cars every three days when maximum production is reached.

The 400-ton per year plant at Glace Bay, Nova Scotia, whose failure initially caused the heavy water shortages is being completely rebuilt by Atomic Energy of Canada and initial output should occur by 1975. Expected needs from the increasing number of nuclear power plants in Ontario and elsewhere have stimulated plans for doubling the capacity of the Bruce heavy water plant to 1,600 tons per year.

Uranium

Deposits of uranium in Ontario and Saskatchewan may be mined more actively as rising demand accompanies increases in the number of nuclear power plants operating within Canada and elsewhere. In addition, export commitments have increased with the sale to Spanish power companies of 9,000,000 pounds of uranium oxide to be delivered by the late 1970's. Present reserves reportedly are adequate to meet all these needs. However, the combination of expected higher domestic and international demand beyond this period would necessitate extensive exploration be undertaken sufficiently in advance to ensure that new reserves reach adequate producing levels in time.

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